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UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF TEXAS

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THE HONORABLE GEORGE C. HANKS, JR., JUDGE PRESIDING

USA, No. 4:21-CR-00009-1

Plaintiff,

vs. ORIGINAL

ROBERT T. BROCKMAN,

Defendant.

COMPETENCY HEARING -- DAY 7 AM SESSION

OFFICIAL REPORTER'S TRANSCRIPT OF PROCEEDINGS

Houston, Texas

TUESDAY, NOVEMBER 23, 2021

APPEARANCES:

For the Plaintiff: COREY J. SMITH, DOJ

CHRISTOPHER MAGNANI, DOJ

LEE F. LANGSTON, DOJ

BORIS BOURGET, DOJ

For the Defendant: JASON S. VARNADO, ESQ., Attorney at Law

COLLEEN O'CONNOR, ESQ., ATTORNEY AT LAW

JAMES P. LOONAM, ESQ., Attorney at Law

KATHRYN KENEALLY, ESQ., Attorney at Law

IRINA K. BLEUSTEIN, ESQ.,

Attorney at Law

For the Interpreter: n/a

Reported by: Sean Gumm, RPR, CRR
Official Court Reporter
United States District Court
Southern District of Texas
sean_gumm@txs.uscourts.gov

Proceedings recorded by mechanical stenography.
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(The following proceedings held in open court.)

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THE COURT: Good morning, everyone.

MR. LOONAM: Good morning, Your Honor.

THE COURT: We finished the last witness last night, so I guess you can call your next witness.

MR. LOONAM: Before we do that, Your Honor, we have one more notice of appearance to note on the record.

THE COURT: Okay.

MR. MALONEY: Good morning, Your Honor. Conor Maloney for Mr. Brockman.

THE COURT: Good morning. Welcome.

MR. MALONEY: Thank you, Your Honor.

MR. COREY SMITH: Just one quick housekeeping matter, Your Honor. Yesterday during the cross-examination of Dr. Guilmette, we marked for identification 161 to 169. I spoke with Counsel. They don't have any objection. We'd like to move those into the record.

08:46:56 THE COURT: Those exhibits are admitted.

08:46:59 MR. COREY SMITH: Thank you.

08:46:59 THE COURT: Just before we get started, were you able to take all of the depositions this weekend or...

08:47:06 MR. LANGSTON: Yes, your Honor. We took the depositions. Um, I wouldn't say it's all done, but we've asked -- based on information we learned, we had a conversation with Lock Lorde about additional digging we would like them to do, and they agreed to do that.

08:47:21 And so, I think -- for the purposes of this hearing I think we're satisfied.

08:47:24 THE COURT: Okay. Great. Perfect. Sounds good. Thank you.

08:47:32 MR. MALONEY: Thank you, Your Honor the Defense calls Dr. Whitlow.

08:47:36 THE COURT: Dr. Whitlow.

08:47:36 **CHRISTOPHER WHITLOW,**

08:47:36 **(For the Defendant)**

08:47:36 called as a Witness, having been duly and regularly sworn, testified as follows:

08:47:50 THE WITNESS: Yes, sir.

08:47:50 THE COURT: Okay. You may take the

stand, sir.

DIRECT EXAMINATION

BY MR. MALONEY:

Q. Good morning, Dr. Whitlow.

A. Good morning.

Q. Please state and spell your name for the record.

A. It's Christopher Whitlow. C-H-R-I-S-T-O-P-H-E-R. Whitlow, W-H-I-T-L-O-W.

Q. Thank you, Dr. Whitlow. What do you do for a living?

A. So I'm a physician/scientist. And, um, I'm an endowed and tenured professor at Wake Forest School of Medicine where I hold the Distinguished Professorship in the Department of Radiology with joint appointments in biomedical engineering and in biostatistics and data science.

Q. Are you affiliated with any research centers at Wake Forest?

A. I am. So I'm the -- we have an Alzheimer's Disease Research Center and Alzheimer's Disease Research Centers -- or they're also abbreviated ADRC's -- are these NHI-funded centers for research, specifically devoted to Alzheimer's disease funded by the National Institutes on Aging. And I'm the

Principal Investigator and Director of the Imaging Core for our Alzheimer's Disease Research Center.

Q. Please briefly explain what the Imaging Core is.

A. Yeah, so the Imaging Core is devoted to collecting imaging data. So that means magnetic resonance imaging, MRI's; positron imaging tomography, PET scans, for all of our -- and other imaging for all of our participants in that study, which include patients with Alzheimer's disease, participants with mild cognitive impairment, and then of course cognitively normal controls.

And we collect those data, and then we process it in certain ways that you process imaging data to use in -- in research studies.

Q. Do you have any clinical responsibilities at the Wake Forest Alzheimer's Disease Research Center?

A. Yeah, at Wake Forest I'm Chief of Neuroradiology, and then serve as interim chair for the Department of Radiology. So clinically this is my speciality in medicine. So interpreting imaging studies, interpreting them to make diagnoses based upon imaging.

Q. And do you conduct any research at the Alzheimer's Disease Research Center?

08:50:31 **A.** Yes. Yes, so -- um, so as a neuroradiologist I
08:50:37 use imaging like MRI, PET scans. So I use them to
08:50:41 diagnose disease on the clinical side. Um, and then
08:50:44 on the research side I use these same imaging tools
08:50:47 like PET and MRI to ask questions about
08:50:52 neurodegenerative disease, specifically Alzheimer's
08:50:55 disease, and have NHI funding to do that work of
08:50:58 approximately somewhere between $8- and $10 million
08:51:01 to study Alzheimer's disease.
08:51:02 **Q.** Okay. Do you study any other neurodegenerative
08:51:04 diseases?
08:51:05 **A.** Yes, Parkinson's disease, traumatic brain
08:51:08 injury, and other processes that lead to
08:51:14 neurodegeneration.
08:51:15 **Q.** Dr. Whitlow, are you board certified?
08:51:18 **A.** I am. I'm board certified by the American
08:51:19 Board of Radiology as a diagnostic radiologist and
08:51:25 with fellowship training in neuroradiology.
08:51:27 **Q.** You covered this a little bit, but what are the
08:51:30 types of patients that you review the scans for at
08:51:33 Wake Forest?
08:51:34 **A.** Sure. So, you know, we're a Level 1 trauma
08:51:38 center, but we also have centers for aging, and
08:51:41 gerontology, and cancer. So it would be the breadth
08:51:46 of patients that have diseases that affect their

brain, head, neck and spine.

And, um, you know, in -- in my area of the country, we're in an area with high prevalence of neurodegenerative diseases, including Alzheimer's disease. And so, a big portion of my practice is, you know, reviewing imaging study in the context of aging, in the context of neurodegenerative diseases including Alzheimer's disease.

Q. Okay. Then what are the most common neurodegenerative diseases that you see in your clinical work?

A. Well, particularly with dementia, Alzheimer's disease is the most common form of dementia. So we certainly see a lot of patients with Alzheimer's disease suffering from mild cognitive impairment, you know, but also a substantial amount of trauma, neuro-oncology, etc.

But ageing and gerontology is one thing we're known for at Wake Forest. And so we have -- a large portion of our practice is devoted to neurodegenerative diseases particularly associated with Alzheimer's disease.

Q. Dr. Whitlow, have you published in connection with your academic and research work?

08:52:52 **A.** I have.
08:52:52 **Q.** Can you please describe some of the topics you have published on in peer-reviewed literature?
08:52:57 **A.** Sure. Using -- so a lot of my focus is using imaging to make associations with, you know, diseases that are gateways to dementia, so vascular disease, measuring structure and function of brain and how that relates to cognitive disfunction -- particularly dementia, mild cognitive impairment -- and so have used it in that context.
08:53:25 **Q.** Dr. Whitlow, can you please briefly describe your educational background?
08:53:30 **A.** Sure. Um, so I have a bachelor's degree in psychology as an undergraduate. Then, um, was admitted into a combined M.D./Ph.D. physician scientist training program. So I have a medical degree, and then Doctor of Philosophy, Ph.D. in neurophysiology and neuropharmacology.
08:53:52 After I graduated, I did an internship in internal medicine for a year, then spent four years, um, in a diagnostic radiology residency program. And then, after that two years in a fellowship -- neuroradiology fellowship.
08:54:10 **Q.** You touched on it at the end there, but can you briefly just describe relevant professional

08:54:14 experience?
08:54:15 **A.** Yeah, so relevant professional experience would
08:54:18 be the patient population that I serve. So, you
08:54:23 know, see a large portion of the population in the
08:54:27 southeast enriched for neurodegenerative diseases
08:54:32 such as Alzheimer's disease. Professional
08:54:34 experiences in research, so -- funded by the
08:54:37 National Institutes on Health to study Alzheimer's
08:54:39 disease and use imaging -- specifically MRI and
08:54:42 PET -- to ask questions about Alzheimer's disease
08:54:45 and neurodegeneration, and how that differs from
08:54:49 mild cognitive impairment and those who are
08:54:50 cognitively normal.
08:55:01 **Q.** Dr. Whitlow, showing you Defense Exhibit 28.
08:55:11 Can you see that Doctor?
08:55:12 **A.** Yes, I do.
08:55:14 **Q.** And, Dr. Whitlow, what is this?
08:55:15 **A.** So this is a portion of my curriculum vitae.
08:55:26 And then, in the middle there's a portion you asked
08:55:30 about professional experience. And here it
08:55:32 describes some of my roles as Course Director for
08:55:36 the Neuroscience Graduate Program; Course Director
08:55:40 for, you know, a radiology research elective; and
08:55:44 some other course directorships.
08:55:46 So a -- as a physician/scientist in

an academic medical center, one of my responsibilities is, you know, training the next generation of scientists and also training the next generation of physicians.

And also not listed is being Director of the MD/Ph.D. combined physician training program. So spend a portion of my time, you know, training graduate students, medical students, and residents and fellows.

Q. Thank you, Dr. Whitlow. Does this -- does your CV accurately reflect your educational background?

A. Let's see here. Educational background.

Q. Let me rephrase. Does your CV accurately reflect your professional experience?

A. Um, yeah. Taken together it does.

Q. And, Dr. Whitlow, does your CV accurately reflect your relevant publications?

A. Yes, except that it would probably -- I'm not sure -- publishing all the time. So, you know, whether this is comprehensive or not would be a question, but it does accurately reflect my work with the exception that, um, there may be five to ten publications that are new that are not on this particular version of my CV.

Q. Understood.

08:57:10 MR. MALONEY: Your Honor, at this point we move to admit Dr. Whitlow in as an expert in the field of neuroradiology with concentration in cognitive disorders.

08:57:19 THE COURT: Assuming no objection, he is so recognized.

08:57:35 MR. MALONEY:

08:57:35 **Q.** Dr. Whitlow, have you been engaged to act as an expert in the matter of Robert Brockman?

08:57:41 **A.** I have.

08:57:41 **Q.** Are you engaged in a group called The Forensic Panel?

08:57:44 **A.** I am.

08:57:45 **Q.** What is The Forensic Panel?

08:57:47 **A.** So The Forensic Panel is a forensic medicine and forensic science practice.

08:57:52 **Q.** Okay. Does The Forensic Panel employ a method called the peer-review process?

08:57:57 **A.** It does.

08:57:58 **Q.** What is the peer-review process?

08:57:59 **A.** So peer-review process is when you organize a multidisciplinary team of experts to review data and to review opinions that are generated in the context of reviewing details of a case, and then to offer those opinions and explore questions that are

relevant, you know, for the said case.
Q. You mentioned a multidisciplinary sort of collaborative process. Did you collaborate with any other experts on this matter?
A. I did, three other experts. So there's a Dr. Agronin, who is a geriatric psychiatrist; Dr. Guilmette, who is a forensic neuropsychologist; then there's Dr. Wisniewski, who is a neurologist; and then myself as a neuroradiologist.
Q. In connection with your work at The Forensic Panel in this matter, do you know how much you've been paid?
A. I believe my rate is $325 an hour. I've been paid -- not a lot, a few thousand dollars.
Q. Would it surprise you to learn you've been paid roughly $3,000?
A. No, that sounds about right.
Q. Are there any outstanding bills for your work in this matter?
A. Probably. There's probably another five to seven hours unbilled.
Q. Would it surprise you to learn there's an outstanding bill of roughly $1,400?
A. No, that wouldn't surprise me.
Q. Dr. Whitlow, you were retained to review

neuroimaging in connection with this case. What type of neuroimaging scans did you review?

A. Yeah, so I reviewed a breadth of imaging cases, so computed tomography; magnetic resonance imaging, or MRI; positron emission tomography, or PET scans.

Q. I will apologize now for --

A. I apologize. Yeah, there's a lot of -- a lot of abbreviations in imaging, so I apologize. I'll try to say them out, and then say what the abbreviation is if that's okay.

Q. Yes. Thank you, Dr. Whitlow. So you mentioned a variety of scans you reviewed in connection with this matter. Mr. Brockman underwent a DaTscan in February of 2019. Did you review that image?

A. I did.

Q. Dr. Whitlow, what is a DaTscan?

A. So a DaTscan is a particular kind of PET scan -- that positron emission tomography or PET scan -- and it uses a specific -- what's called a tracer that's injected that then binds to a particular part of the brain called the dopamine transporter and a particular part of the brain called the substantia nigra compacta.

And it's used to diagnose Parkinson's disease.

09:00:57 **Q.** Can you please spell that out?
09:00:59 **A.** It's a tracer -- and so you inject that and it
09:01:11 goes to the brain, and it binds to the dopamine
09:01:16 transporter in a part of the brain relevant for
09:01:24 Parkinson's disease called the substantia nigra
09:01:28 compacta. And that's substantia,
09:01:31 S-U-B-S-T-A-N-T-I-A; nigra, N-I-G-R-A; compacta,
09:01:37 C-O-M-P-A-C-T-A. It's relevance is that it's used
09:01:43 -- those are areas that are implicated in
09:01:48 Parkinson's disease, and the specific purpose of the
09:01:50 scan is to -- in the context of diagnosing
09:01:54 Parkinson's disease.
09:01:55 **Q.** So DaTscans are used to diagnose Parkinson's
09:01:58 disease?
09:01:58 **A.** They are.
09:01:58 **Q.** Can you explain the technique of how a DaTscan
09:02:01 is actually performed?
09:02:02 **A.** Sure. So, a patient presents and this radio
09:02:10 tracer, as they're called, is injected
09:02:13 intravenously. And they lay on a PET scanner, which
09:02:18 then collects data and creates this map of their
09:02:22 brain showing where, um, this -- this tracer is
09:02:26 taken up.
09:02:29 In Parkinson's disease, you lose
09:02:33 neurons in this part of the brain called the

substantia nigra compacta. And so, what you would expect to see is reduced uptake in that area, which can support the diagnosis of Parkinson's disease.

Q. Understood. Mr. Brockman underwent a DaTscan in February of 2019?

A. Yes.

Q. Did you review these images?

A. I did.

Q. Did you review the interpreting radiologist's impression of those images?

A. I did.

Q. Did you agree with the interpreting radiologist's impression of these images?

A. Yes.

Q. Dr. Whitlow, I'm showing you Defense Exhibit Number 37. Turning to -- it's Bates stamped BCM-744.

A. Yes. So, "Severe loss of dopaminergic neuronal function in the bilateral dorsal striata with greater on the right compared to the left."

So agree with that.

Q. And is that the interpreting radiologist's impression of this DaTscan?

A. Yes.

Q. In laymen's terms, can you please explain what

severe loss of dopaminergic neuronal function means?
A. Yes. So dopamine neurons in the brain project to motor areas that control motor function. And so, if you have a loss of those you have a loss of motor function. So the loss of these neurons translates into a loss of function, specifically motor function.
Q. Okay. So sort of boiling it up, practically speaking, what is the significance of the finding on this DaTscan?
A. So this would be consistent with what one would see in a patient with Parkinson's disease.
Q. In addition to the DaTscan, Mr. Brockman also underwent two what are called FDG-PET scans at the request of the Government's neurologist, Dr. Darby. Mr. Brockman underwent one FDG-PET scan in March of 2021, and a second FDG-PET scan in August of 2021. At a very high level, in layman's terms what is an FDG-PET scan?
A. So FDG stands for fluorodeoxyglucose, and it's a kind of sugar. The brain uses sugar as fuel, so areas of the brain that are highly metabolic burns lots of sugar. Parts of the brain that are less -- you know, working less burn less sugar. And so a fluorodeoxyglucose, or FDG-PET scan, is used to

09:05:19 evaluate function or brain metabolism -- metabolism
09:05:26 in the brain.
09:05:26 **Q.** Is that related to brain hypometabolism?
09:05:30 **A.** Right. So hypo would just be giving a
09:05:34 magnitude of the metabolic activity. So hypo is
09:05:37 less metabolic activity. Hyper, for example, would
09:05:41 be more metabolic activity. So hypometabolism --
09:05:44 sorry -- specifically referred to less metabolism.
09:05:47 **Q.** Hypometabolism referring to less metabolism in
09:05:52 certain areas of the brain?
09:05:53 **A.** Correct.
09:05:53 **Q.** What does less metabolism in certain brain
09:05:57 regions -- what does that indicate about that
09:05:58 particular brain region?
09:05:59 **A.** Right. So if it's hypometabolism compared to
09:06:02 normal, that would indicate that there's pathology
09:06:05 there. That specifically there's disease affecting
09:06:08 the brain that's causing, you know, metabolic,
09:06:12 hypometabolism.
09:06:12 **Q.** And similar to DaTscan, very briefly, what is
09:06:18 -- sort of the technique used to conduct an FDG-PET?
09:06:23 What's involved?
09:06:23 **A.** Sure. It's very similar in that you would get
09:06:26 a tracer -- a radio tracer -- again, in this case
09:06:30 instead of the Dat radio tracer you'd use FDG. And

09:06:36 then you'd inject that into the patient
09:06:38 intravenously. And then you would put them on the
09:06:41 PET scanner, and you'd acquire data that then would
09:06:44 be used to generate a map of metabolic activity in
09:06:48 the brain, which is the picture that then the
09:06:51 radiologist interprets.
09:06:53 **Q.** How are FDG-PET scans used in the diagnosis of
09:06:56 Alzheimer's disease?
09:06:57 **A.** Right. So in Alzheimer's disease you are
09:07:00 looking for a pattern of hypometabolism that would
09:07:05 be in an anatomical distribution consistent with
09:07:09 Alzheimer's disease. So you are looking for a
09:07:10 pattern of hypometabolism.
09:07:16 **Q.** And as I mentioned, Mr. Brockman underwent the
09:07:20 first FDG-PET scan in this matter in March of 2021.
09:07:24 Did you review these images?
09:07:26 **A.** I did.
09:07:26 **Q.** Did you review the interpreting radiologist's
09:07:29 impression of these images?
09:07:30 **A.** Yes.
09:07:31 **Q.** Did you agree with the interpreting
09:07:33 radiologist's impression of these images?
09:07:34 **A.** Yes.
09:07:41 **Q.** Dr. Whitlow, showing you Defense Exhibit 39.
09:07:48 **A.** Yep, where it says, "Mildly reduced uptake in

front parietal lobe" --
Q. Before we get there --
A. Sorry.
Q. -- what is this document?
A. This is the final report that the radiologist generated when he or she interpreted the FDG-PET scan.
Q. This is for the March FDG-PET scan?
A. Correct.
Q. Can you see that there on your screen?
A. Yes. So the -- so you have the findings of mildly reduced uptake in the right parietal lobe. And the conclusion or impression is that the findings are mild, but suggestive of early neurodegenerative disease, either Alzheimer's disease or dementia with Lewy bodies -- so Parkinson's disease with dementia.
Q. Okay. If we can break that down a little bit. What is the right parietal lobe?
A. So the brain is composed of these different areas, and they're named pretty descriptively. So front lobe is the front part of the brain. Then there's temporal lobes on the side. Parietal lobe is in the back, and it's a posterior region that's sort of at the top back of the brain.

09:09:02 **Q.** What sort of cognitive functions does the
09:09:04 parietal lobe govern?
09:09:09 **A.** So, of course, distilling it to a few words
09:09:11 probably, you know, oversimplifies the function.
09:09:15 But, you know, some of the functions that it -- it
09:09:20 is involved in is like sensory integration, so
09:09:22 integrating all of your senses, vision, hearing,
09:09:25 tactile perception and distilling that and sending
09:09:27 that information to other parts of the brain, you
09:09:30 know, used in functions like memory, complex
09:09:36 cognitive functions, et cetera.
09:09:43 **Q.** I think you already covered this, the findings
09:09:43 that the interpreting radiologist reported. And the
09:09:46 interpreting radiologist reported, "Mildly reduced
09:09:47 uptake in the right parietal lobe."
09:09:50 What is reduced uptake -- what does
09:09:52 that indicate?
09:09:53 **A.** So it indicates that there's less metabolic
09:09:57 activity than would be expected for a normal person.
09:10:01 So it suggests that is -- you know, that's abnormal
09:10:07 -- it's an abnormal finding. It would suggest
09:10:10 disease, a neurodegenerative process at play. And
09:10:13 then you have to ask, you know, what would that
09:10:15 neurodegenerative process be?
09:10:16 And in this case, um, it's very

09:10:19 common to see hypometabolism in parietal lobe in
09:10:24 patients with dementia, specifically Alzheimer's
09:10:29 dementia.
09:10:29 **Q.** So reduced uptake in the parietal lobe is a
09:10:33 pattern you would see with someone with Alzheimer's
09:10:35 disease?
09:10:35 **A.** Right. It would certainly raise concern that
09:10:38 would be the underlying cause of that finding.
09:10:41 **Q.** So for Mr. Brockman, what does -- what is the
09:10:44 significance of the findings on this March FDG-PET
09:10:47 scan?
09:10:48 **A.** Well, it -- it -- it suggests that, number one
09:10:54 -- it indicates, objectively, that there's a
09:10:56 neurodegenerative process. And then, in terms of
09:11:00 explaining what that neurodegenerative process is,
09:11:02 it offers an explanation based on the pattern that
09:11:06 this would raise concern as a physician for
09:11:09 Alzheimer's -- for Alzheimer's dementia.
09:11:16 **Q.** In addition to the March FDG-PET, there was a
09:11:27 second FDG-PET conducted in this matter.
09:11:30 Mr. Brockman underwent a second FDG-PET scan at the
09:11:35 request of the Government in August of 2021. Did
09:11:39 you review these images?
09:11:40 **A.** I did.
09:11:41 **Q.** Did you review the interpreting radiologist's

09:11:43 impression of these images?
09:11:45 **A.** Yes.
09:11:45 **Q.** Did you agree with the interpreting
09:11:48 radiologist?
09:11:49 **A.** Yes.
09:11:57 **Q.** Dr. Whitlow, showing you Defense Exhibit 45.
09:12:12 Can you see that Dr. Whitlow?
09:12:13 **A.** I do.
09:12:15 **Q.** What is this document?
09:12:16 **A.** This is again the final report associated with
09:12:19 the PET scan.
09:12:21 **Q.** The PET scan from August?
09:12:22 **A.** Yes, from the -- from the later PET scan, the
09:12:25 second PET scan.
09:12:31 **Q.** Did you see the findings and impression there
09:12:34 Dr. Whitlow?
09:12:35 **A.** I do. So again, "Mildly reduced uptake in
09:12:38 posterior temporal lobes, and bilaterally in the
09:12:41 parietal lobes, and slightly reduced uptake in the
09:12:43 front lobes."
09:12:44 Then the conclusion or impression
09:12:46 of that finding is that they're mild, but again
09:12:50 suggestive of neurodegenerative disease,
09:12:52 particularly Alzheimer's disease.
09:12:53 **Q.** I think you already covered the parietal lobe,

09:12:56 and I think you covered where the temporal lobes are
09:13:00 located, but what cognitive functions are governed
09:13:02 by the temporal lobes?
09:13:04 **A.** Right. So the report mentions temporal lobes.
09:13:07 So temporal lobes are involved in all sorts of
09:13:10 memory, working memory. And then it also mentions
09:13:16 frontal lobes, which are involved in executive
09:13:19 functioning, so decision-making and those sorts of
09:13:22 functions.
09:13:24 **Q.** What does reduced uptake in the temporal,
09:13:30 parietal, and frontal lobes indicate?
09:13:33 **A.** Well, again it indicates -- well, number one
09:13:35 it's an abnormality. It's abnormal. It suggests
09:13:39 that there's a neurodegenerative process at play,
09:13:43 and the pattern would be very suggestive of
09:13:46 Alzheimer's.
09:13:47 **Q.** Okay. So taking a step back. For
09:13:50 Mr. Brockman, what is the significance of this
09:13:52 August FDG-PET scan?
09:13:53 **A.** So the significance -- significant really in
09:13:56 two ways. First of all, it -- it shows that there's
09:14:00 a neurodegenerative process at play, with
09:14:04 Alzheimer's disease being the leading diagnosis. It
09:14:07 also has relevance, because when it's compared to
09:14:09 the first PET scan there are more areas of

09:14:13 abnormalities, so a more diffused pattern of
09:14:17 abnormal uptake suggests that there's been
09:14:20 progression of disease.
09:14:21 **Q.** Okay. We're going to dig a little bit into
09:14:24 that. But here we have multiple -- we have two
09:14:28 FDG-PET scans. In your clinical practice, how do
09:14:31 you reach a diagnosis when you have multiple neuro
09:14:34 images?
09:14:34 **A.** So in -- in -- all physicians do this that you
09:14:38 -- you take all of the information that you have at
09:14:40 hand and you distill that, and you -- you, um, look
09:14:44 at it objectively, weigh it, and then your job is to
09:14:48 explain, you know, what could be underlying the
09:14:52 objective data that you have in front of you. And
09:14:54 in this case, when you put all of the neuroimaging
09:14:58 studies together it looks like, you know -- having
09:15:01 seen, you know, thousands of patients with
09:15:03 Alzheimer's disease, mild cognitive impairment,
09:15:06 those who are cognitively normal, and in addition to
09:15:09 a variety of other diseases, looking at this it
09:15:12 looks like it's from a patient with Alzheimer's
09:15:14 disease.
09:15:14 **Q.** And you indicated that you compared the March
09:15:17 and August FDG-PET scans; correct?
09:15:20 **A.** I did.

09:15:21 **Q.** What did that comparison show for the metabolic
09:15:24 pattern on these FDG-PET scans?
09:15:26 **A.** Right. So, um, it went -- you know, it -- it
09:15:29 -- it, um expanded in terms of the areas of the
09:15:33 brain that were affected. So in the first PET scan,
09:15:36 fewer brain areas. Second pat scan, more brain
09:15:40 areas. Um, so suggested that there had been, um, a
09:15:45 progressive neurodegenerative process that had
09:15:47 occurred between those two time points.
09:15:49 **Q.** So there was progression between March and
09:15:53 August of this year between the two FDG-PET scans.
09:15:57 What does that progression indicate about the
09:16:01 disease course for Mr. Brockman?
09:16:02 **A.** Well you know, Alzheimer's can have variable
09:16:09 progression. But given there's a change over a
09:16:11 relatively short period of time it raises concern
09:16:13 that the disease is proceeding rapidly for
09:16:16 Mr. Brockman in this specific case.
09:16:18 **Q.** So over a five -- roughly five and a half month
09:16:21 period there'd been progression. Just so I'm clear,
09:16:36 the progression over a roughly five and a half month
09:16:38 period, is that something you would expect to see?
09:16:41 **A.** Um, you can see it, but it is more rapid than
09:16:49 -- I would say it's a little more rapid than
09:16:52 typical. And again, it shows that the burden --

there's a greater burden of disease in the brain than we saw on the first PET scan.

Q. Dr. Whitlow, switching gears a little bit away from the FDG-PET scans. In addition to the two FDG-PET scans that were conducted, Mr. Brockman also underwent a different type of PET scan in this matter called a beta-amyloid PET scan. What is a beta-amyloid PET scan?

A. Right. So beta-amyloid scan is, again, another kind of PET scan where -- and, you know, we've talked about different tracers. In this situation, the tracer binds to a protein called amyloid that can accumulate in the brain. And when it accumulates, that's abnormal. It's called a proteinopathy, you know, pathology -- pathologically-accumulated protein in the brain.

The specific relevance is that amyloid proteinopathy, or this abnormal deposition of amyloid in brain is one of the hallmarks of Alzheimer's disease.

Q. Just breaking that down a little bit. So beta-amyloid PET scan measures the buildup of a particular protein?

A. Correct.

Q. And that particular protein is what?

09:18:15 **A.** Amyloid.
09:18:19 **Q.** And what is the significance of buildup of
09:18:24 amyloid in the brain?
09:18:24 **A.** So buildup of amyloid in the brain is
09:18:27 pathologic. It's -- it's basically, um, ultimately
09:18:36 associated with disfunction of brain. And it has
09:18:40 functional consequences so that, you know, that --
09:18:44 that abnormal accumulation of -- of that protein can
09:18:48 have cognitive effects and is associated with
09:18:54 Alzheimer's dementia.
09:18:56 **Q.** So aside from just sort of generalized --
09:18:58 generally indicating some cognitive disfunction,
09:19:05 there's an association with a particular disease?
09:19:07 **A.** Yes, it's -- it's associated with Alzheimer's
09:19:09 disease and considered one of the hallmarks of the
09:19:12 disease, the presence of an amyloid proteinopathy.
09:19:17 **Q.** So Mr. Brockman underwent a beta-amyloid PET
09:19:21 scan in July of 2021. Did you review these images?
09:19:25 **A.** I did.
09:19:25 **Q.** Did you review the interpreting radiologist's
09:19:29 impression of these images?
09:19:29 **A.** I did.
09:19:29 **Q.** Did you agree with the interpreting
09:19:32 radiologist's interpretation?
09:19:33 **A.** Yes.

09:19:45 **Q.** Dr. Whitlow, showing you Defense Exhibit 42.
09:20:01 Dr. Whitlow, can you see this image?
09:20:03 **A.** Yes.
09:20:03 **Q.** What is this document?
09:20:04 **A.** So this is the final report for the amyloid PET
09:20:10 scan.
09:20:11 **Q.** What was the interpreting radiologist's
09:20:14 impression?
09:20:15 **A.** His impression is that it's a positive study,
09:20:18 indicating moderate to frequent amyloid neuritic
09:20:22 plaques.
09:20:22 **Q.** Okay. What does the phrase moderate to
09:20:24 frequent plaques -- what does that mean?
09:20:26 **A.** Basically, as you accumulate amyloid in brain,
09:20:30 to be able to kind of look at a PET scan and
09:20:33 visually see it based on what we know from
09:20:36 pathologic sectioning of brain that if you can see
09:20:40 it, it's suggestive of moderate to frequent amyloid
09:20:43 neuritic plaques.
09:20:44 And in this case, these amyloid PET
09:20:46 scans are kind of read in a binary way. They're
09:20:48 positive or negative. In this case it's a positive
09:20:51 study.
09:20:51 **Q.** So positive study indicating there are, in
09:20:54 fact, amyloid neuritic plaques present?

09:20:57 **A.** Correct.
09:20:59 **Q.** Taking a step back, practically speaking, what
09:21:04 is the significance of these findings from this
09:21:07 scan?
09:21:08 **A.** Sure. There's significance in the context of
09:21:11 the -- of the -- all of the neuroimaging when you
09:21:14 put it together. But, you know, having amyloid
09:21:17 positivity reenforces the patterns that we're
09:21:21 seeing, you know, on the PET scan would be
09:21:23 compatible and raise concern that this patient has
09:21:26 Alzheimer's disease.
09:21:28 **Q.** So you said it reenforces the findings from the
09:21:32 FDG-PET scans. What does the positive beta-amyloid
09:21:38 PET scan indicate about the probability of
09:21:41 Mr. Brockman's disease diagnosis?
09:21:42 **A.** Sure. In medicine, that's what we're dealing
09:21:44 with is probabilities. So when you look at pattern
09:21:48 of hypometabolism that we discussed, and you put
09:21:51 that in the context of amyloid-positive PET scan
09:21:57 that taken together raises the -- increases the
09:22:02 probability that this patient has Alzheimer's
09:22:04 disease.
09:22:09 **Q.** So we've just discussed three different --
09:22:14 three PET scans. There were the two FDG-PET scans,
09:22:18 and then there was the third beta-amyloid PET scan.

09:22:22 All three of them had positive findings for
09:22:25 Alzheimer's disease; is that correct?
09:22:27 **A.** Correct.
09:22:30 **Q.** What is the significance of these three
09:22:33 congruent PET scans?
09:22:35 **A.** Well, again, they all support each other. You
09:22:40 know, when you -- when you look at all of the PET
09:22:44 data together, number one it indicates that
09:22:48 Mr. Brockman has Parkinson's disease.
09:22:52 Number two, it indicates he has a
09:22:54 progressive and kind of aggressive/progressive
09:22:57 neurodegenerative process, which the pattern and the
09:23:01 amyloid positivity would point to Alzheimer's
09:23:04 disease as being the most probable etiology or
09:23:08 cause.
09:23:08 **Q.** You said progressive and aggressive?
09:23:10 **A.** Right. In that -- I guess I mean aggressive in
09:23:14 that it's -- there's been quite a lot of change over
09:23:18 a relatively short period of time in the FDG-PET
09:23:22 scan. The burden of disease has gotten greater in a
09:23:26 short period of time.
09:23:27 **Q.** Is that a finding you would expect to see on an
09:23:30 FDG-PET scan and the beta-amyloid PET scan conducted
09:23:35 in a short period of time?
09:23:36 **A.** Again, you know, it would point towards a

progressive neurodegenerative disease with Alzheimer's being the one that would be expected to produce that kind of increase in disease burden over a relatively short period of time.

Q. Dr. Whitlow, in your supplemental report you cite a recent study that analyzed the qualitative result from beta-amyloid PET scans and FDG-PET scans.

A. Correct.

Q. What was the purpose of that study?

A. Yeah. So again, the purpose is to try to improve accuracy of clinical diagnosis in a clinical setting. So again, as radiologists we look at these PET scans. We look at imaging qualitatively. We look at it, and look visually for patterns.

And so what they were trying to do is take, um, all of these different kinds of PET scans and see if when you add them together they improve your ability to make an accurate diagnosis, um, compared to the gold standard. Okay.

Q. What is the gold standard?

A. Yeah, the gold standard in diagnosing Alzheimer's disease is brain biopsy, you know, looking at the brain after you've extracted it, which you can only do after death. So in this

09:24:54 particular study it's very interesting. So they
09:24:56 were able to use patients who had Alzheimer's
09:25:01 disease that was diagnosed with pathology using the
09:25:05 gold standard methods of looking at the brain
09:25:08 pathologically.
09:25:09 So these were patients who had died
09:25:12 of, you know, and who had -- who had Alzheimer's
09:25:15 disease. These patients also had FDG-PET scans and
09:25:22 they had amyloid PET scans. And when the patients
09:25:27 had this anatomic pattern of hypometabolism in kind
09:25:35 of temporal, parietal, posterior cingulate regions
09:25:39 that we've been discussing, in addition to amyloid
09:25:44 positively qualitatively that it approached nearly
09:25:48 100 percent sensitivity and specificity for
09:25:50 diagnosing Alzheimer's disease.
09:25:54 **Q.** Okay. You covered a lot of ground there.
09:25:55 **A.** Okay. Sorry about that. I can break it down.
09:25:57 **Q.** Want to break it down a little bit. So the
09:26:00 patients in this study were confirmed to have
09:26:03 Alzheimer's disease postmortem?
09:26:05 **A.** Yes, they were confirmed to have Alzheimer's
09:26:07 disease postmortem using the gold standard method,
09:26:11 which is pathologic assessment -- looking directly
09:26:14 at their brain under a microscope.
09:26:16 **Q.** Okay. Before they died and their brain was

09:26:18 examined postmortem, the patients in this study were
09:26:25 examined using FDG-PET scan and beta-amyloid PET
09:26:29 scan; is that correct?
09:26:30 **A.** That's correct.
09:26:30 **Q.** And what did their beta-amyloid and FDG-PET
09:26:36 scans indicate?
09:26:36 **A.** Well, very similar to Mr. Brockman, their
09:26:39 FDG-PET scans had hypometabolism in these areas that
09:26:42 we've been discussing, these temporal and posterior
09:26:46 areas of the brain. And their amyloid scan was
09:26:49 positive. So recall that the -- these are read, you
09:26:53 know, as sort of binary -- positive or negative.
09:26:55 So in the setting of a positive --
09:26:57 I'm sorry, positive amyloid scan, plus this pattern
09:27:01 of this anatomic pattern of hypometabolism that when
09:27:05 you add those together, those two pieces of
09:27:07 information, there was -- it was almost a hundred
09:27:11 percent sensitive and specific for the diagnosis of
09:27:14 Alzheimer's disease, which was determined by --
09:27:16 postmortem by that gold standard pathologic
09:27:19 assessment.
09:27:20 **Q.** So you have a positive beta-amyloid PET scan.
09:27:23 You have a positive FDG-PET scan, reflecting a
09:27:25 pattern of hypometabolism?
09:27:27 **A.** Correct.

09:27:27 **Q.** And when those two things are congruent, the
09:27:31 study indicated that accuracy approached 100 percent
09:27:35 postmortem of diagnosis of Alzheimer's disease?
09:27:37 **A.** Correct.
09:27:37 **Q.** You mentioned sensitivity and specificity. Can
09:27:44 you explain those terms?
09:27:46 **A.** Sure. Sensitivity is, you know, if you test
09:27:49 positive, what's the probability you are positive?
09:27:53 Specificity is that, you know, if you test negative,
09:27:56 well, what's the probability that you are actually
09:27:58 negative? So when you put those two together, you
09:28:02 know, if it's positive you most certainly have it.
09:28:04 If it's negative, you most certainly don't.
09:28:07 So again, it improves, you know,
09:28:09 using -- as a physician, using that information we
09:28:12 can be more confident that when we see that pattern
09:28:16 and we say this could be Alzheimer's disease that we
09:28:18 can be even more confident in that diagnosis.
09:28:21 **Q.** And the confidence is -- according to the
09:28:25 findings from this study, the confidence is
09:28:27 approaching 100 percent diagnostic certainty?
09:28:29 **A.** Agreed. Yes. That's correct.
09:28:32 **Q.** We've discussed this, but Mr. Brockman has a --
09:28:38 had a positive beta-amyloid PET scan and two
09:28:41 positive FDG-PET scans?

09:28:42 **A.** Correct.
09:28:43 **Q.** What -- practically speaking, what did the
09:28:46 findings from this study indicate for Mr. Brockman?
09:28:48 **A.** Well, if you extrapolate that the findings from
09:28:50 this study to Mr. Brockman, then -- you know,
09:28:53 looking at his FDG-PET scan and his amyloid
09:28:57 positivity, you'd be -- you know, you'd be very,
09:29:00 very confident that he has Alzheimer's disease.
09:29:04 **Q.** Okay. And I think the study mentioned a
09:29:06 different tracer used on the beta-amyloid PET scan
09:29:10 than the tracer that was conducted -- that was used
09:29:13 for Mr. Brockman's beta-amyloid PET scan?
09:29:15 **A.** Sure.
09:29:16 **Q.** Is there any reason that the findings from this
09:29:18 study could not be used clinically for Mr. Brockman?
09:29:22 **A.** Um, no. In fact, that's the -- that's the
09:29:25 intent of the study is to -- is to make, you know --
09:29:29 is to identify patterns that are useful clinically.
09:29:32 So the compound that was used -- the tracer that was
09:29:36 used in the study is one that's called Pittsburgh
09:29:39 compound B or PIB. And, you know, it's again one of
09:29:45 these tracers that binds to amyloid.
09:29:47 The one that was used in -- in
09:29:53 Mr. Brockman is Amyvid, which is the commercial name
09:29:55 for a tracer that also binds to amyloid. There's a

09:29:59 reason --
09:29:59 **Q.** What do you use in your clinical practice?
09:30:02 **A.** We use Amyvid, we use FDA approved compound on
09:30:06 Mr. Brockman.
09:30:06 **Q.** Why do you use Amyvid compared to -- as opposed
09:30:08 to Pittsburgh 11c/PIB?
09:30:13 **A.** You know, the PIB -- it requires special
09:30:16 equipment to produce. So it was the first
09:30:17 generation amyloid agent. It requires special
09:30:22 equipment, this piece of equipment called a
09:30:25 cyclotron to make. And then it -- once you make it,
09:30:28 it only lasts -- it's only -- it only lasts for
09:30:33 minutes.
09:30:33 So you have to make it, and then
09:30:35 give it to the patient within minutes -- produce and
09:30:38 give it within minutes and acquire the data. Well,
09:30:41 people who don't have this specialized machine, then
09:30:43 they don't have access to this amyloid tracer. So
09:30:46 it would only be useful at major academic centers
09:30:50 like ours where he we have a cyclotron. So over
09:30:57 years, there was the determination that it would be
09:30:58 very useful to have an amyloid agent that had a
09:31:01 better profile that could be used clinically.
09:31:05 So Amyvid -- Amyvid is a
09:31:08 second-generation amyloid agent that, um, can be

09:31:11 produced in large quantities and shipped -- and
09:31:16 lasts for much longer for many hours.
09:31:19 So it can be made and distributed.
09:31:22 So it's more useful clinically than the Pittsburgh
09:31:27 compound B. And it's FDA approved and is typically
09:31:30 what we use in a clinical setting.
09:31:31 **Q.** Okay. Just taking a step back and
09:31:34 extrapolating the findings from the study, to the
09:31:38 study of Mr. Brockman's two FDG-PET pet scans and
09:31:40 the beta-amyloid PET scan, what does this study
09:31:43 indicate about the probability of Mr. Brockman's
09:31:45 diagnosis?
09:31:46 **A.** Again, it would indicate there's a very, very
09:31:49 high probability that his pattern of hypometabolism,
09:31:54 plus the positive beta-amyloid PET scan, that he
09:31:57 would have Alzheimer's disease as the diagnosis.
09:32:06 **Q.** Okay. Switching gears and stepping away from
09:32:07 the PET scans. In addition to the PET scans, you
09:32:10 also reviewed brain MRI images?
09:32:13 **A.** Yes.
09:32:13 **Q.** Mr. Brockman underwent brain MRI imaging on
09:32:18 November 2, 2018 --
09:32:19 **A.** Yes.
09:32:19 **Q.** -- June 6, 2021, and July 30, 2021? Very
09:32:27 briefly, what is a brain MRI scan?

09:32:29 **A.** So an MRI scan -- magnetic resonance imaging or
09:32:35 MRI scan -- is a way of taking pictures of the brain
09:32:39 using a giant magnet, and it produces these
09:32:42 structural images of the brain.
09:32:45 **Q.** Okay. And a brain MRI -- what is it measuring?
09:32:49 **A.** It's depicting -- it's showing a structural
09:32:52 image of the brain so you can see what the brain
09:32:55 looks like, um, and then evaluate it for disease
09:33:01 basically. So, for example, you are looking for the
09:33:03 size, the shape -- you know, the volume of the
09:33:06 brain. So in particular you are looking for -- is
09:33:08 there, you know, damage to the brain. Is there
09:33:11 volume loss or atrophy, which would be abnormal in
09:33:15 the context of a patient's presentation.
09:33:19 **Q.** And how are brain MRI scans used for the
09:33:24 diagnosis of Alzheimer's disease?
09:33:25 **A.** So again, they're evaluated visually. So you
09:33:29 look at them. You are looking for a pattern of
09:33:32 atrophy, um, a pattern of volume loss or abnormal
09:33:37 volume loss called atrophy. And you are looking for
09:33:42 that -- a very similar pattern, sort of posterior
09:33:44 and temporal pattern of atrophy.
09:33:47 **Q.** Okay. You mentioned visually examining the
09:33:49 brain MRI images. Is that what's referred to as a
09:33:53 qualitative analysis or qualitative review?

09:33:57 **A.** Yes.
09:33:57 **Q.** Please explain what a qualitative analysis or
09:34:01 review -- what does that mean?
09:34:03 **A.** Right. So in all of medicine -- and in
09:34:06 neuroradiology in particular -- you know, you are
09:34:09 doing a physical exam and visually looking at the
09:34:13 patient. So you are visually looking at the
09:34:15 patient, and you are looking for aspects of the
09:34:18 patient's brain in this case that are abnormal. And
09:34:23 when you are doing that, you are relying on, you
09:34:25 know, years of experience and looking at thousands
09:34:28 and thousands of, you know, normal and abnormal
09:34:31 brains.
09:34:32 You are trying -- you are looking
09:34:34 for a pattern that points to, you know, a diagnosis.
09:34:42 **Q.** So the qualitative review is based, in part, on
09:34:45 years of experience in reviewing thousands of brain
09:34:48 MRI images. Do you receive any special education in
09:34:53 conducting a qualitative review as a
09:34:55 neuroradiologist?
09:34:56 **A.** Yes, so there's a -- we receive -- that's a lot
09:34:58 of the training is how to objectively, and in a
09:35:04 systematic way, look at the brain -- all of the
09:35:08 brain structures and make determinations as to
09:35:11 whether it's normal or abnormal.

09:35:13 And then if you see an abnormality,
09:35:15 to then explain that with, you know, what's called a
09:35:18 differential diagnosis. You know, what could
09:35:21 explain the finding that you have observed? And we
09:35:27 learn patterns different that are compatible with
09:35:30 different kinds of diseases.
09:35:31 In this case, this pattern of
09:35:32 atrophy and temporal and posterior regions that
09:35:35 would be, you know, what we would look for -- that
09:35:37 when we see it points to a diagnosis of Alzheimer's
09:35:40 disease.
09:35:46 **Q.** And is a qualitative review -- scratch that.
09:35:59 Is a qualitative review another way of saying your
09:36:02 clinical judgment?
09:36:04 **A.** Um, judgment -- you know, I think -- I think
09:36:07 what we would say in the field is that, um, this
09:36:11 qualitative, um -- um, evaluation is looking at the
09:36:17 data -- an objective, um -- um, systematic review of
09:36:23 the data that's in front of us, in this case a brain
09:36:27 MRI image.
09:36:28 **Q.** So in other words, a qualitative review is what
09:36:30 you do as a neuroradiologist?
09:36:32 **A.** It's what we do as a neuroradiologist, yes.
09:36:35 **Q.** We're going to come back to this in a little
09:36:38 bit. But distinct from a qualitative review, can a

brain MRI be analyzed quantitatively?

A. Yes, it can be analyzed quantitatively. That brings us from the clinical side into the realm of research. But you can, you know, basically -- in so many words -- pull out a ruler and measure things and come up with numbers. But I would say that is not widespread -- that is not standard of care because of limitations of those -- of that method. There are limitations in doing that, and the numerical value that you get, number one, can be inaccurate, and also generally does not make a difference in terms of managing a patient.

Like, if you look at the study and have a number, the number is not necessarily going to drive your management. Um, really the management is going to be driven by that qualitative approach that we just discussed.

Q. Is another word for a qualitative analysis a Neuroreader® report?

A. A quantitative --

Q. Quantitative, yes.

A. Yes, the Neuroreader® report is a quantitative analysis of the brain.

Q. In your clinical practice, what method of analysis do you use when reviewing brain MRI's?

09:37:55 **A.** We use the standard of care, which is
09:38:00 qualitative analysis or qualitative evaluation.
09:38:04 **Q.** As I mentioned before, Mr. Brockman underwent a
09:38:07 brain MRI in 2018. Did you review those images?
09:38:10 **A.** I did.
09:38:11 **Q.** Did you review the interpreting radiologist's
09:38:15 impression of those images?
09:38:16 **A.** Yes.
09:38:17 **Q.** Did you agree with the interpreting
09:38:19 radiologist's interpretation of those images?
09:38:23 **A.** Yes.
09:38:28 **Q.** Dr. Whitlow, showing you Defense Exhibit 36.
09:38:52 Defense Exhibit 36. Turning to Bates stamped
09:39:01 BCM-793. Can you see this document, Dr. Whitlow?
09:39:09 **A.** Yes.
09:39:09 **Q.** Okay. What is this document?
09:39:11 **A.** So this document is the MRI report. So the
09:39:18 radiologist looked at the MRI, described what he
09:39:22 saw, and then comes to a conclusion at the end,
09:39:24 which is the impression.
09:39:25 **Q.** And this is for the 2018 MRI?
09:39:27 **A.** Let's see. Yes.
09:39:39 **Q.** What was the interpreting radiologist's
09:39:40 impression of this MRI?
09:39:42 **A.** "No intracranial abnormalities, particularly no

09:39:46 disproportionate lobar atrophy."
09:39:51 **Q.** You previously stated you agreed with the
09:39:53 interpreting radiologist's impression of this MRI?
09:39:55 **A.** Yes.
09:40:01 **Q.** Did you appreciate anything else other than
09:40:03 what is noted by the interpreting radiologist here?
09:40:08 **A.** Not really. You know, he talks about global
09:40:10 atrophy. You know, that's symmetric, and that is
09:40:14 the case.
09:40:15 **Q.** Global atrophy -- is that global brain atrophy?
09:40:19 **A.** Right, so sort of the whole brain is involved.
09:40:21 And at that time it didn't look like any of the
09:40:23 lobes that we talked about -- you know, frontal,
09:40:25 temporal, parietal -- didn't look like any one that
09:40:29 had anymore atrophy or more volume loss than
09:40:32 another.
09:40:32 **Q.** So just sort of a generalized atrophy for the
09:40:35 entire brain -- the entire brain is shrinking?
09:40:41 **A.** Yes.
09:40:41 **Q.** This might be redundant, but I want to make
09:40:43 sure we cover it. What does diffuse cerebral volume
09:40:47 loss -- what does that mean?
09:40:47 **A.** So diffuse means it's everywhere, and volume
09:40:50 loss refers to the brain. So the volume of the
09:40:53 brain itself has -- has -- has reduced so the volume

09:41:00 is smaller.
09:41:00 **Q.** Okay. So global volume loss and diffused
09:41:06 cerebral volume loss -- is that just two ways of
09:41:08 saying the same thing?
09:41:09 **A.** Right, sort of global loss of brain.
09:41:11 **Q.** What does this 2018 brain MRI indicate about
09:41:15 Mr. Brockman's diagnosis?
09:41:17 **A.** Well, it's -- it -- I think it probably is a
09:41:22 good baseline, you know, from which to compare. So
09:41:25 he -- in 2018, there was already a background of
09:41:31 diffuse volume loss. And -- you know, I think
09:41:36 that's -- that's what it would indicate.
09:42:17 **Q.** And the quote regarding diffuse cerebral volume
09:42:21 loss, where does that come from?
09:42:24 **A.** It's just -- it's a descriptive. It's just
09:42:27 kind of a general, descriptive way of -- of
09:42:32 documenting what the neuroradiologist is seeing on
09:42:36 the brain MRI.
09:42:37 **Q.** Is that a phrase you used in your supplemental
09:42:39 expert report?
09:42:40 **A.** Is it a phrase that --
09:42:42 **Q.** Diffuse cerebral volume loss?
09:42:46 **A.** Diffuse cerebral volume loss -- I can't recall
09:42:47 if I specifically used that or not.
09:43:05 THE COURT: Doctor, I wanted to ask you

09:43:07 a quick question.
09:43:08 THE WITNESS: Yes, sir.
09:43:08 THE COURT: On the MRI that we just
09:43:10 looked at that had some, you know, global shrinking
09:43:15 of the brain --
09:43:16 THE WITNESS: Yes.
09:43:16 THE COURT: -- what kinds of problems,
09:43:18 based on what you see, would be exhibited by the
09:43:21 patient? I mean, you would have general memory
09:43:22 complaints, or what would you see?
09:43:24 THE WITNESS: Yeah, sure. Sure.
09:43:25 That's a great question. There's a lot of debate
09:43:28 about what shrinkage of the brain means as we get
09:43:32 older. You know, some people say that's a normal
09:43:34 phenomenon and you just see it. I think in
09:43:37 geroscience, the study of aging, we're starting to
09:43:41 realize shrinking of the brain is something we see,
09:43:43 but it's not necessarily normal. And it can be
09:43:46 because of a variety of things, you know, like
09:43:48 hypertension can cause your brain to shrink, high
09:43:52 cholesterol, vascular disease, diabetes -- all of
09:43:53 these things can accumulate over time and cause your
09:43:56 break to shrink.
09:43:58 So when people say "Normal aging,"
09:44:00 we're not so sure that's normal. It can be

09:44:02 pathologic aging. And in terms of how that
09:44:04 specifically translates into behavior well, you
09:44:07 know, you would start to expect to see some level of
09:44:10 cognitive decline. Um -- and so, you know, you
09:44:13 would expect that with a baseline brain like that
09:44:20 there could be initial cognitive decline or
09:44:22 cognitive disfunction, you know, when your brain
09:44:26 starts to shrink.
09:44:28 I mean, when you lose brain, you
09:44:31 are losing function. And, you know, sometimes
09:44:33 cognitive tests certain sensitivity. Maybe they can
09:44:36 pick that up or maybe they can't, but we know
09:44:38 objectively from looking at the MRI data that the
09:44:41 brain is smaller. And when you are losing brain,
09:44:41 you are losing function. So you would expect some
09:44:41 degree of cognitive dysfunction, whether it can be
09:44:46 measured or not.
09:44:46 THE COURT: Thank you, Doctor. Sorry
09:44:48 to take you off task.
09:44:49 THE WITNESS: No.
09:44:50 THE COURT: But just curious.
09:44:52 THE WITNESS: Yeah, sure.
09:44:55 MR. MALONEY:
09:44:55 Q. Continue this discussion. Dr. Whitlow, in
09:44:58 addition to the 2018 MRI, Mr. Brockman also

09:45:02 underwent two additional brain MRI's in 2021, one in
09:45:04 June -- I guess a third in July of 2021. Did you
09:45:08 review these images?
09:45:10 **A.** I did.
09:45:10 **Q.** Did you review the interpreting radiologist's
09:45:12 impression?
09:45:12 **A.** Yes.
09:45:13 **Q.** Did you agree with the interpreting
09:45:14 radiologist's impression?
09:45:16 **A.** Yes, and then also added, I think, a little bit
09:45:22 to their impression as well.
09:45:33 **Q.** Dr. Whitlow, showing you Defense Exhibit 43.
09:45:46 Dr. Whitlow, what is this document?
09:45:47 **A.** So this is the report that was generated by the
09:45:51 radiologist who interpreted Mr. Brockman's, um, MRI
09:45:56 scan on the date that's indicated on the report.
09:46:01 **Q.** This is the July brain MRI?
09:46:03 **A.** Yes.
09:46:08 **Q.** Can you see that image, Dr. Whitlow?
09:46:10 **A.** I can.
09:46:10 **Q.** What was the interpreting radiologist's
09:46:12 findings for this brain MRI?
09:46:14 **A.** So, "Moderate diffuse cerebral volume loss with
09:46:19 proportional ventricular prominence," and then
09:46:22 what's called "Mild chronic microvascular ischemic

change."
Q. "Moderate diffuse cerebral volume loss" -- again, does that just mean global brain volume loss?
A. Right. And it's not mild, it's moderate. So it relates to the magnitude of volume loss.
Q. And in this brain MRI, the magnitude is greater, comparative to the 2018 MRI?
A. Correct. And -- and, um, you know, the comparison that was used on this study is the CT of the head. I made an additional comparison to the 2018 MRI scan. So I had those two in front of me, and I can look at them very carefully.

And I think the place where I added was that it looked like, to me, that there'd been quite a lot of progression of volume loss between 2018 and 2021. In particular, I -- I could see some prominence of volume loss, in particular in the temporal regions.
Q. Before we get to a comparison between the 2018 and 2021 MRI, just focusing on the 2021 MRI.
A. Got you.
Q. What does this MRI indicate about Mr. Brockman's diagnosis?
A. Well, you know, he's -- now he's at the point with, you know, moderate volume loss. So he's lost

09:47:42 -- he's lost brain. Um, and in particular when you
09:47:48 put that into context with what we've seen on the
09:47:51 PET scan would again support the diagnosis of
09:47:54 Alzheimer's disease.
09:47:55 **Q.** "Moderate diffuse volume loss" -- moderate.
09:47:58 Does that indicate just a little bit of volume loss?
09:48:00 **A.** No, that would indicate more than just a
09:48:03 little. That would be quite -- you know, quite
09:48:08 noticeable. It's undeniable and visually striking
09:48:14 the amount of volume loss that you'd be seeing.
09:48:19 **Q.** Is moderate volume -- brain volume loss normal
09:48:24 for an 80-year-old man?
09:48:26 **A.** Um, it's -- I would say again I would not
09:48:32 consider moderate volume loss to be normal. I would
09:48:34 consider it to be abnormal. So this would be an
09:48:40 abnormal finding to me. And, you know, it would
09:48:43 raise concern about downstream function of this
09:48:48 patient.
09:48:48 **Q.** When you say "downstream function," are you
09:48:50 referring to an individual's cognitive function?
09:48:52 **A.** Yeah, I would say cognitive function. So all
09:48:54 of the functions -- you know, you have the brain,
09:48:56 and different parts of the brain subserve different
09:49:00 functions. If you lose brain in the area that
09:49:03 serves a function, then I would expect to see, you

know, some abnormality in that downstream cognitive function that relates to the brain that was, you know, lost.

THE COURT: Let me ask a question. Sorry to interrupt you.

THE WITNESS: Oh, yes.

THE COURT: So is that loss quantifiable, like a one-to-one loss or --

THE WITNESS: That's really interesting. That's the fascinating thing is it's not a one-to-one situation. So you can have very, very small changes in brain that have a profound effect on your cognitive function, and then you can have bigger changes really -- you know, obvious big changes that have very little effect.

I think it's probably related to location, location, location. You know, if you hit that right spot, even a very small change can have a profound effect. So it's really more about -- it's about magnitude -- about magnitude and location.

THE COURT: Thank you.

I'm sorry, Counsel.

I appreciate you indulging me, Doctor.

THE WITNESS: No, no, no, happy to do

it.

THE COURT: You may continue.

MR. MALONEY: Thank you, Your Honor.

Q. Dr. Whitlow, that was -- we were just focused on the 2018 MRI, and then on the 2021 brain MRI individually. Did you compare the images from the 2018 and 2021 MRI's?

A. Yes, I -- I did. So I had -- you notice that the radiologist compared to the head CT. So he may not have had access to the 2018 brain MRI, and so I had the opportunity to look at both the 2018 and the 2021 MRI's side by side.

Q. And what does your interpretation -- for the comparison of the 2018 and 2021 MRI's, what did that comparison indicate?

A. So looking at them side by side, you know, it was visually striking the amount of volume loss, or the amount of atrophy that had occurred between 2018 and 2021. In particular, I looked at areas of the brain -- I don't know if I want to go into a lot of detail. But just when I was objectively and systematically kind of going through the brain, um, it looked very much like -- in addition to volume loss everywhere that was, um -- and really, you could really only appreciate this by looking at the

09:51:24 2018 and 2021 scans together, but you could see that
09:51:29 volume loss there was some predominance within the
09:51:32 temporal lobes specifically.
09:51:35 **Q.** Did your comparison indicate anything about the
09:51:37 progression of volume loss between 2018 and 2021?
09:51:42 **A.** Yes, it's -- it's quite a lot of progression.
09:51:44 So it would be more than what I would expect from
09:51:47 aging.
09:51:49 **Q.** So this is not consistent with normal aging?
09:51:51 **A.** This would not be -- you know, again, I -- I --
09:51:55 I struggle with normal aging, because I think we
09:51:57 don't really know what normal aging is. But it's
09:52:00 definitely not compatible with what I would see, you
09:52:04 know, with just someone getting older and the amount
09:52:05 of volume loss that would be typical to see in
09:52:08 people getting older. This was more dramatic than
09:52:11 that, and the magnitude was greater than what I
09:52:15 would expect just from aging alone.
09:52:16 **Q.** We touched on this previously, but you
09:52:18 described actually putting up the 2018 brain MRI and
09:52:22 the 2021 brain MRI side by side?
09:52:26 **A.** Yes.
09:52:26 **Q.** Is that the qualitative review you discussed
09:52:30 earlier?
09:52:30 **A.** Yes, that's the qualitative review. Again, you

09:52:32 put them side by side, and you are objectively and
09:52:34 systematically going through all of the structures
09:52:37 of the brain and making comparisons, and then
09:52:39 putting that into context of what you have seen over
09:52:41 your career.
09:52:43 **Q.** Is that consistent with the practice that you
09:52:44 would have in your clinical practice if you had
09:52:47 multiple brain MRI's?
09:52:48 **A.** Yes, that -- that is -- that is my clinical
09:52:51 practice. That is -- that is the job of the
09:52:53 neuroradiologist to do that.
09:53:05 **Q.** We touched on this a little bit before, but
09:53:08 what areas -- which areas of the brain did you
09:53:10 appreciate atrophy in comparing the 2018 and 2021
09:53:14 MRI's?
09:53:15 **A.** Well, certainly there was atrophy all over the
09:53:18 brain. But in particular when I'm looking at it,
09:53:21 there was quite a lot in an asymmetric way when I
09:53:27 compared the temporal lobe of 2018 to 2021.
09:53:31 **Q.** We discussed this a little bit before, but --
09:53:33 and you described where the temporal lobe is located
09:53:36 in the brain. And again, what cognitive functions
09:53:38 does the temporal lobe govern?
09:53:40 **A.** So most notably memory -- memory function.
09:53:43 **Q.** What is the significance of temporal lobe

atrophy?
A. Well, temporal lobe atrophy is again -- would be within that pattern that you would be looking for to make a determination of what the underlying cause of the neurodegenerative process is. In this case, it points to a diagnosis of Alzheimer's disease.
Q. So these findings indicate a diagnosis -- a disease diagnosis of Alzheimer's disease?
A. Yes.
Q. What do those findings indicate about Mr. Brockman's cognitive function?
A. Well, again, when I see -- you know, when you see a brain that -- where there's been a lot of brain loss and you had to say, you know, what would you expect -- what would you expect to see of a patient with a brain like this? You would expect cognitive disfunction.

You would expect something more than mild. You would expect dementia.
Q. Okay. You mentioned something more than mild. Are you referring to mild cognitive impairment?
A. Yes, you would expect more than mild cognitive impairment. You would expect -- you would say -- if I had to predict, you know, who this came from, I would say it came from a patient with dementia.

09:54:51 **Q.** And based solely on a comparison of the 2018 and 2021 brain MRI's -- imaging?
09:54:54
09:54:57 **A.** Right.
09:55:00 **Q.** We discussed this a little bit before, the qualitative review that you conducted of the 2018 MRI -- 2021 MRI and the 2018 and 2021 comparison. There were also two qualitative analyses conducted in this matter?
09:55:10
09:55:14
09:55:23
09:55:26
09:55:27 **A.** Correct.
09:55:27 **Q.** We referred to them earlier as the Neuroreader® reports?
09:55:30
09:55:30 **A.** Yes.
09:55:31 **Q.** What is a Neuroreader® report?
09:55:33 **A.** The Neuroreader® reports -- first of all, Neuroreader® is just a company. It's a vendor that generates these reports. You send them your data, and they generate this quantitative analysis where they, you know, numerically measure parts of the brain. And then they compare that, you know, to a population.
09:55:36
09:55:39
09:55:41
09:55:46
09:55:50
09:55:53
09:55:55 They derive, like, a Z-score where they can give you the percentile -- how your -- how your individual patient -- the -- you know, the percentage that they, um, differ from the overall population that they were compared to.
09:55:59
09:56:04
09:56:07
09:56:11

09:56:13 **Q.** You mentioned a comparison group that the
09:56:16 individual patient is being compared against?
09:56:18 **A.** Correct.
09:56:20 **Q.** What are these comparison groups?
09:56:22 **A.** Well, it's -- it's hard to know. There's not
09:56:26 -- there's not a lot of information about the
09:56:29 comparison group, except for, you know, what's
09:56:31 reported, you know, by the company. And I think in
09:56:36 this case, in particular, I recall that it was a,
09:56:39 um, age-matched control group who had normal
09:56:42 cognitive function. But I don't -- there's --
09:56:44 there's more I don't know that would be highly
09:56:47 relevant about this comparison group that I don't
09:56:50 know.
09:56:50 **Q.** So the comparison group -- the information that
09:56:52 we have about this comparison group -- and is this
09:56:54 for the 2018 Neuroreader® report or the 2021
09:56:58 Neuroreader® report?
09:56:58 **A.** I believe there were Neuroreader® reports from
09:57:01 the 2018 MRI and the 2021 reports. And the company
09:57:05 that provided these Neuroreader® reports would
09:57:07 process them in the same way.
09:57:09 **Q.** So it's the same comparison group between the
09:57:12 2018 and 2021 Neuroreader® reports?
09:57:14 **A.** I don't know that I can say that, but that

would be my presumption. But I can't say that for sure, if that's the exact same comparison group.

Q. And you described some of the information that's -- that's -- that you understand about the comparison group that was used in these Neuroreader® reports. You mentioned that the comparison group indicates the age of that group. What other information would be relevant in measuring an individual against a comparison group?

A. Okay. Well, you know, we know a lot about what affects brain volume, um, just in general. Um, so -- and there are lots and lots of things that can affect brain volume.

Q. Like what?

A. So for example, how you -- from the time you were in utero, what your -- what your mother ate, what she was exposed to. Did she smoke? Did she drink?

When you were born, were you held more or less? Did you grow -- you know, what kind of food did you eat growing up, high quality food or poor quality food? Did you -- um, how much education did you have? Did you come from a high socioeconomic status background or a low socioeconomic status background?

What are the things you did during your life span? Did you smoke? Did you drink? Did you have uncontrolled hypertension, diabetes -- any number of diseases?

You know, all of these can affect brain volume. And so, to take an individual -- you know, Mr. Brockman -- you have to -- you have to understand what the comparison group is. So, you know, just age alone is hard to interpret what -- what a percentile difference means when you compare Mr. Brockman to a group that you just don't know anything about.

Oh, sorry.

Q. If you know the age and the cognitive function being normal for the comparison group, is that a sufficient amount of information for you to make a comparison for an individual's brain, like Mr. Brockman's brain MRI, against a comparison group?

A. I don't think so, because I could -- I could take three different groups of people in his age range with normal cognitive function. Um, and let's say group one were all astrophysicists who had undergone a tremendous amount of training throughout their life -- rigorous training who were healthy and

09:59:33 fit. Then I have another group of 80-year-olds who,
09:59:36 you know, were the same age and cognitively normal,
09:59:41 but who, you know, maybe had -- had diabetes and
09:59:47 uncontrolled hypertension their whole life.
09:59:49 So when I then compare
09:59:52 Mr. Brockman's brain to each of those, I'm going to
09:59:54 get a completely different number. In one case he
09:59:57 could have -- you know, in the group who had normal
10:00:00 cognitive function who are his age but had smoked
10:00:03 their whole life, who had uncontrolled diabetes,
10:00:06 hypertension -- other diseases -- he could have
10:00:09 actually slightly, you know -- you know, very
10:00:12 similar brain volume to them.
10:00:14 Um, that's compared to the enriched
10:00:16 group who maybe were super healthy, fit, and
10:00:19 exercised all of their life and did all of the
10:00:21 things that promote brain volume he could be
10:00:25 substantially lower. So you could have one number
10:00:27 that says he doesn't differ much from the
10:00:29 population, and you can have another number that
10:00:31 says he differs a lot from the population.
10:00:33 And so, that's one reason why in
10:00:35 clinical medicine we just don't generally rely on
10:00:37 these reports. They're interesting but, you know,
10:00:39 we just can't rely on it because there's too much

10:00:42 that we don't know about the comparison group.
10:00:44 **Q.** In your clinical work, do you rely on
10:00:46 Neuroreader® reports?
10:00:46 **A.** No, we don't rely on Neuroreader® reports.
10:00:49 It's not the standard of care. I mean, currently
10:00:53 the standard of care is the qualitative assessment
10:00:57 that we discussed.
10:00:57 **Q.** In your work as the head of the Neuroimaging
10:00:59 Core at Wake Forest Alzheimer's Disease Research
10:01:02 Center, do you rely on Neuroreader® reports?
10:01:04 **A.** Not in clinical practice. We do -- we -- we
10:01:10 only use quantitative kinds of analyses for research
10:01:15 purposes, but we don't use that in clinical
10:01:17 practice.
10:01:18 **Q.** As I mentioned before, there are two
10:01:19 Neuroreader® reports in this matter, one based on
10:01:22 the 2018 MRI, and the second based on the July 2021
10:01:28 brain MRI. Did you review a Neuroreader® report
10:01:31 associated with the 2021 brain MRI?
10:01:34 **A.** I did.
10:01:34 **Q.** Generally, what did the 2021 Neuroreader®
10:01:38 report indicate?
10:01:39 **A.** You know, in general it just indicated there
10:01:41 was -- that there was atrophy and volume loss. It
10:01:45 gave a -- you know, it gave a distribution and

10:01:48 numbers, but -- you know, but my takeaway was that
10:01:51 there was volume loss and atrophy.
10:01:53 **Q.** So it indicated there was volume loss. What
10:01:55 did it indicate in informing a diagnosis -- a
10:01:59 disease diagnosis?
10:02:00 **A.** I didn't use it at all. It didn't -- it didn't
10:02:04 inform my conclusions at all. It supported kind of
10:02:09 my qualitative assessment if that was volume loss
10:02:13 and it also said there was volume loss. In that
10:02:15 sense, it supported what I already knew, but it
10:02:17 didn't add any value beyond that really.
10:02:21 **Q.** We've been discussing solely one Neuroreader®
10:02:24 report, based on one brain MRI, but there are two
10:02:28 Neuroreader® reports here based on two brain MRI's
10:02:32 conducted roughly three years apart?
10:02:33 **A.** Sure.
10:02:34 **Q.** Did you compare the results of the 2018 and
10:02:37 2021 Neuroreader® reports?
10:02:40 **A.** Yeah. I looked at them, yes.
10:02:41 **Q.** What did that comparison indicate?
10:02:43 **A.** I think, in general, it -- it showed that there
10:02:48 were -- there was volume loss in both. My
10:02:51 recollection is that the more recent Neuroreader®
10:02:54 report had more areas where there was, you know,
10:02:59 diminished volume than the first group Neuroreader®

report.
Q. You discussed some of the limitations of a Neuroreader® report based solely on one brain MRI. Are there any limitations comparing two separate Neuroreader® reports?
A. Yeah, there are -- there are -- for quantitative imaging where you are deriving a number -- a numerical value from an imaging study, there are limitations in that you can -- there's measurement error -- quantitative measurement error between scanners.
Q. Okay. Please explain what you mean by that.
A. So in other words you can have two scanners from the same vendor -- let's say Siemens, GE, or some other vendor. These machines could have been made on the conveyor belt, side by side. Purchased by the same healthcare system. Installed.

You can take, let's say, a synthetic phantom that we use to look at the quality of imaging -- or a person -- myself. You could scan me in scanner one and scanner two simultaneously, or you can scan the phantom one in both scanners. And then you could do a quantitative analysis.

And the quantitative analysis could differ substantially just based on the scanners

alone, up to something like 30 percent difference between scanner one and scanner two, even though ground truth is that there should be no difference.

Q. So two exact -- two of the exact same type of scanner coming off the conveyor line side by side, installed at the same facility with the same subject?

A. Yeah, with the same subject. Now, that's for a quantitative measurement. So it's important to differentiate that that limitation is not there for a qualitative analysis.

This is why. Again, the MRI is a giant magnet. At the factory they tune the magnet to produce a visually, you know, interpretable image that we can see. And so, you know, when you -- when you look at the images, the images look identical. But it's at sort of the millimeter level that you really can't perceive visually where the measurement of error comes into play.

And so, you know, you could have -- you could have a difference in the millimeter measurement that you just can't even perceive. So visually you can compare, and it's accepted and part of general practice to make comparisons from different scanners visually. What is not -- what is

10:05:26 not done, and what is not standard of care, is to
10:05:30 compare numerical values that are derived from two
10:05:34 different scanners, because there can be measurement
10:05:37 error. And you might not be able to visually
10:05:39 perceive it, but that becomes important when you are
10:05:41 making comparisons and conducting statistical
10:05:44 analyses.
10:05:45 Because you can see differences
10:05:47 that are just due to measurement error alone, and
10:05:50 that's not reason why we don't rely on these kinds
10:05:53 of reports in clinical practice. We're hoping the
10:05:55 day comes where we can incorporate more quantitative
10:05:59 analysis and that day is coming, but it has not
10:06:02 arrived yet.
10:06:02 **Q.** So boiling this up, the limitations that
10:06:05 pertain to Neuroreader® reports do not pertain to
10:06:08 qualitative analysis that you conduct?
10:06:09 **A.** Right, these limitations don't really pertain
10:06:11 to qualitative analysis. They pertain to
10:06:15 quantitative analysis, you know, at the millimeter
10:06:17 level.
10:06:21 **Q.** Focusing just on the 2021 Neuroreader® report,
10:06:24 did you order the 2021 Neuroreader®?
10:06:27 **A.** No.
10:06:27 **Q.** Did you rely on it in your expert report?

10:06:31 **A.** No.
10:06:31 **Q.** Why did you cite the 2021 Neuroreader® report in your expert report?
10:06:36 **A.** You know, as a physician -- neuroradiologist in particular -- there's no reason not to use every piece of data that you have. Because part of an objective, systematic review is using all data that you have. So I'm not going to throw away data. I'm going to look at it, evaluate its relevance and -- and knowing its limitations. I'm going to have the limitations in mind when I review that -- those data.
10:07:10 **Q.** Dr. Whitlow, showing you Defense Exhibit 58.
MR. LOONAM: Identification only.
MR. MALONEY: For identification only.
10:07:21 **Q.** Dr. Whitlow, can you see this image?
10:07:23 **A.** I can.
10:07:24 **Q.** Okay. Can you see the text at the top of these three here?
10:07:30 **A.** I can.
10:07:30 **Q.** And these -- what are these based on?
10:07:34 **A.** Okay. So these are really interesting. So the top -- the top row is from the 2018 scan, and the bottom row is from the 2021 scan.
10:07:43 **Q.** Okay.

10:07:44 **A.** So -- and then there's different colors. Um, so the gray color is the comparison group, and the line is sort of like the mean. So you can see the range -- the range that extends from that line. So it -- it's -- so normal spans from the bottom part of the gray to the top part of the gray.

Then they've basically, you know, extrapolated what the mean is from that population. Then they've plotted Mr. Brockman as a -- as a dot, compared to sort of the mean. And so, the top row -- it suggests that he falls in line with the mean generally.

And then, in the 2021-case, it looks like maybe some of these -- he's further away from the mean on -- on all of these images.

Q. You talked about the limitations of longitudinal study in comparison to Neuroreader® reports. Is this image an accurate reflection of Mr. Brockman's brain volume loss?

A. You know, I don't think the -- I can't say that the numerical data that's provided here, the plot, is accurate for -- because number one, I don't even know -- it looks like the population is different that they're comparing him to if you look at the gray. So the population is different.

10:08:57 Also, it was done on two different
10:08:59 scanners. So again, you know, I just -- I can't --
10:09:03 I can't be confident that the numbers that this is
10:09:06 giving me is accurate. I can say that it looks
10:09:09 like, um, you know the 2021, in general, looks like
10:09:14 there's more atrophy. But beyond that, you know, I
10:09:19 wouldn't feel -- I don't feel comfortable -- I just
10:09:22 don't feel very confident in the numbers its giving
10:09:25 me because of the limitations of this kind of report
10:09:27 that we've discussed.
10:09:27 **Q.** Did you rely on this comparison of images in
10:09:30 forming your opinion?
10:09:31 **A.** No. No.
10:09:32 **Q.** Dr. Whitlow, do you know what the slice size is
10:09:36 for the two Neuroreader® reports that were used
10:09:38 here?
10:09:38 **A.** I don't know.
10:10:06 **Q.** Dr. Whitlow, showing you what is Government
10:10:11 Exhibit 43.
10:10:11 **A.** Okay.
10:10:13 **Q.** Can you see the image?
10:10:16 **A.** Yes.
10:10:17 MR. MALONEY: 143, excuse me.
10:10:18 **Q.** Can you see this image?
10:10:19 **A.** I can.

10:10:23 **Q.** Are you familiar with this image?
10:10:25 **A.** I am familiar with this image.
10:10:26 **Q.** Have you reviewed the two articles cited at the
10:10:29 bottom of this image?
10:10:30 **A.** I have.
10:10:30 **Q.** Starting with the top line next to, "PD
10:10:37 dementia," what is this top image representing?
10:10:41 **A.** So this is very interesting. So this is not an
10:10:44 image that we would interpret clinically. This is
10:10:48 what's called a statistic parametric map. So
10:10:52 it's -- we've all heard of statistics, so you have
10:10:54 -- the way they made this image is you have two
10:10:57 groups; right? So you have -- in the top row a
10:10:59 group of patients who have Parkinson's disease
10:11:03 dementia, and then you have another control group.
10:11:08 And what's -- this -- this image
10:11:09 reflects a statistical analysis saying where do
10:11:13 patients with Parkinson's dementia have, you know,
10:11:18 statistically significant lower metabolism compared
10:11:23 to the controls, and specifically where in the brain
10:11:26 would you expect to see this hypometabolism and
10:11:30 Parkinson's disease compared to controls?
10:11:31 So it's called a statistical
10:11:37 parametric map. And the red color is -- is -- is
10:11:42 spatially where that would occur based upon the

10:11:44 p-value. In this case, I believe they used p-value
10:11:47 of .001. We all know when you do a statistical
10:11:50 analysis you have to have a p-value as a threshold
10:11:53 to say what's different from controls.
10:11:55 And in this case, the red is -- is
10:11:59 where in brain the dementia -- the Parkinson's
10:12:01 dementia patients differed from controls.
10:12:04 **Q.** Okay. So is it the same thing for the line for
10:12:06 the AD dementia group?
10:12:07 **A.** Correct. So they -- again, this is a visual
10:12:10 representation of a statistical exam. So it's not a
10:12:13 clinical -- it's not a clinical image that a
10:12:18 radiologist would interpret. It's a statistical
10:12:20 map.
10:12:20 And so -- so in this case, the two
10:12:22 groups are patients with Alzheimer's disease
10:12:25 compared to control, and where patients with
10:12:28 Alzheimer's disease have hypometabolism that's
10:12:31 statistically different than the control group.
10:12:34 **Q.** And then this bottom image, 8/24/21, -- first
10:12:41 of all, is this an image of Mr. Brockman's
10:12:43 August 24th FDG-PET scan?
10:12:44 **A.** No, this is also a statistical map.
10:12:47 **Q.** Okay.
10:12:48 **A.** So this is not something I would interpret in

my clinical practice.
Q. Where do these images come from?
A. So all of these images are processed. They're just -- you take data and process it and generate this map. So the bottom -- the bottom row came from Dr. -- I'm blanking on the --
Q. Ponisio?
A. Ponisio, yeah. It came from Dr. Ponisio and her quantitative analysis of Mr. Brockman's PET scan. And so, in this case the blue and the purple colors represent hypometabolism that's -- if it's blue, it's two standard deviations from the mean. If it's purple, it's three standard deviations from the mean.

So in this case, we're looking at a map of standard deviation from the mean, but none of these are anything that I would interpret in clinical practice.

THE COURT: Can I -- just -- so what would you use this for, if for anything?

THE WITNESS: Well, you would use it for research purposes. In the top two cases, that's what they did. So in research, we're looking -- we're using groups to look for patterns. Um, the problem with research when you are doing it on

groups is can you generalize that to an individual? Um? And that's -- that's where clinical translation comes into play.

Let's say you see a pattern like this, and you've determined that from research. Now you have to say, "Okay. Well, let's start looking at our patients and see if it matches what we've discovered from this kind of group analysis."

So, you know -- but from -- the top two rows are group statistical analyses. But this would not be the kind of image I -- this is not an image of an individual. An individual would look -- you know, could look very different from this.

In fact, I think we'll get to some of the individual differences that led to the creation of these images, which I can talk about.

THE COURT: Thank you, Doctor.

THE WITNESS: Yeah. Sure.

MR. MALONEY:

Q. Dr. Whitlow, focusing on the magnitude of the red seen on these top two rows of imaging, and comparing it to the magnitude of the blue in this bottom image, what does that comparison indicate?

A. Well, I think it's very misleading. It's very misleading, because it's apples and oranges. You

10:15:09 know, you've got -- you've got a statistical
10:15:13 parametric map on the top two rows. And the
10:15:15 threshold for the red, specifically, is -- the
10:15:18 amount of red that you see is directly related to
10:15:21 the p-value that the investigator chose.
10:15:24 So in this case, .001. So if you
10:15:27 think of a p-value as something that you can slide
10:15:30 and make greater or smaller, if you -- if you -- if
10:15:33 you change that number you can increase the red or
10:15:36 decrease the red.
10:15:37 So the amount of red is operator
10:15:41 dependent. It's chosen by the investigator. He
10:15:43 chose .001. This is what it looks like. If he
10:15:47 chose .01, you'd see more red. If he chose .00001,
10:15:52 there'd be less red.
10:15:53 In the case of the bottom image,
10:15:54 it's not even the same threshold. So the top two
10:15:57 images are thresholded by a p-value. The bottom
10:16:01 image is thresholded by a standard deviation.
10:16:04 Again, chosen by the person who created the image.
10:16:07 Chosen to be two standard deviations as blue, and
10:16:10 three standard deviations as purple.
10:16:13 So again, if I took standard
10:16:15 deviation and I slid it back and forth, and I went
10:16:17 down to one standard deviation from the mean, well

there'd be a lot more blue. If I went four standard deviations from the mean, there'd probably be no color.

So again, the magnitude is chosen by the person who is -- is basically ultimately controlled by the person who, you know, created the image. And -- and it can be manipulated. You can make more red or less red based upon that decision. So in that sense it's misleading. It's apples and oranges because, number one, the threshold they used to create these images are different.

And then, it's -- it was chosen by the person who made the image. So it's not really -- so the magnitude -- so magnitude is really meaningless. It kind of -- it's a little upsetting for me because, you know, my clinical practice is based on imaging to get to the truth. My research practices, you know, is based on using imaging to get to the truth.

And, you know, I think that this -- this is really concerning to me because it seems like someone is trying to manipulate an audience to say that, "Oh, well, you know, clearly there's more disease" -- you know -- "Mr. Brockman clearly doesn't have as much disease as you expect."

But that's not the case at all. That's not true. As someone who trains graduate students, if one of my graduate students brought this to me trying to make this comparison and present it, I would be kind of upset about that because it's disingenuous and misleading.

Q. Thank you, Dr. Whitlow. Stepping away from the magnitude, and understanding that you cannot compare to the top two images to the magnitude reflected on the bottom row imaging, understanding that limitation, can you compare the pattern that's reflected in these images?

A. I think that would -- you know, knowing this -- first of all, you have to know how these images were made to derive their importance. I think -- clearly you can't -- you cannot evaluate -- you can't compare the magnitude. I think it's probably appropriate to compare the pattern.

So when I look at the overall pattern, the distribution of abnormalities that are identified -- so looking at where the blue is on these images compared to where the red is on those images looks very similar. So if I -- my interpretation of this image is that, you know, the PET scan -- the data from 8/24 basically reflects a

pattern of dementia. So I would say the blue looks like dementia based on the two images above it.

Q. Dr. Whitlow, you mentioned having reviewed both of the articles cited at the bottom of this image; is that correct?

A. That's correct.

Q. Focusing solely on this article, "Edison, et al," and the article is entitled -- the first two words in the article are "*Amyloid Hypometabolism*."

A. Mm-hmm.

Q. Did you review that study?

A. I did.

Q. Dr. Whitlow, showing you Government Exhibit 142(a).

A. Yes.

Q. And is this the study that's referenced?

A. Yes.

Q. This is *Amyloid Hypometabolism* by Edison. What is this -- what -- when was this study conducted?

A. It was conducted in 2007. So it's a little old, relatively speaking in the research world.

Q. And how many subjects were a part of this study?

A. Not very many. So 19 patients with Alzheimer's disease compared to 14 controls. Small, meaning

10:20:16 hard to generalize to the population when you have
10:20:18 such a small population.
10:20:19 **Q.** Dr. Whitlow, is this the image that was
10:20:21 reflected in the prior image I showed you?
10:20:24 **A.** I believe it is. It's hard because it's in
10:20:26 black and white, but I believe that was the image
10:20:29 that was basically deconstructed, and then
10:20:30 reconstructed in a linear format rather than this
10:20:34 format.
10:20:34 **Q.** So this -- so Figure 3 is the same image
10:20:38 reflected on Government Exhibit 143?
10:20:41 **A.** Right. I think they kind of have taken it
10:20:43 apart and presented it as a row instead of as a
10:20:46 grid, yes.
10:20:56 **Q.** Dr. Whitlow, focusing on Page 503 of that
10:21:00 study.
10:21:00 **A.** Mm-hmm.
10:21:03 **Q.** This is under the results for the study.
10:21:05 **A.** Okay.
10:21:08 **Q.** Can you see that image?
10:21:09 **A.** I can't.
10:21:12 **Q.** Highlighted text?
10:21:13 **A.** You might have to slide it over to catch the
10:21:16 end of the phrase. Little more -- there you go.
10:21:24 **Q.** How's that?

10:21:26 **A.** Sorry, if you can go up just a little bit.
10:21:28 Sorry. There, that's perfect. Perfect.
10:21:41 **Q.** Dr. Whitlow, let me know after you've had a
10:21:44 chance to review this paragraph.
10:21:46 **A.** I've reviewed it.
10:21:47 **Q.** Focusing on this line here, "A 70-year-old
10:21:50 woman, Case 1, was clinically diagnosed," and it
10:21:54 goes down.
10:21:56 It says, "This patient was reassessed
10:21:59 20 months later and [11C]PIB uptake was essentially
10:22:04 unchanged. However, her behavioral performance had
10:22:06 deteriorated. [18] FDG-PET was normal on both
10:22:11 occasions."
10:22:11 **A.** Yes.
10:22:12 **Q.** Focusing solely on that statement, what does
10:22:14 that indicate?
10:22:15 **A.** In this case, you had a patient who had been
10:22:17 diagnosed with Alzheimer's disease, who had an
10:22:19 FDG-PET scan that was no different than the control
10:22:23 group, so it looked normal. And that's relevant,
10:22:26 because the image that you saw that was created on
10:22:29 that second row included her. So what does that
10:22:34 mean? Well, that means that -- that image is an
10:22:38 average. It's -- you know, it's a statistical
10:22:42 parametric map where it shows a group difference.

10:22:45 Well, we have to think about what's
10:22:47 the range you might expect to see in that
10:22:49 Alzheimer's disease group. Well, in this study, the
10:22:52 range of abnormal PET was all the way from normal to
10:22:56 -- to basically the pattern that you see. So you
10:22:59 can't just walk away saying, "That pattern is" --
10:23:03 you know -- you have to have to it. Because, in
10:23:07 fact, this Alzheimer's disease patient looked
10:23:09 normal.
10:23:09 So again, the range of abnormality
10:23:11 is all the way from normal to that pattern. So then
10:23:14 when you take that into consideration with
10:23:16 Mr. Brockman, you know, he -- his -- his FDG-PET is
10:23:20 not normal. So he would easily fall within that
10:23:24 Alzheimer's disease group that was used to create
10:23:26 that image.
10:23:28 **Q.** And continuing on from there the quote picks
10:23:34 up, "The second patient, Case 2, was a 66-year-old
10:23:37 man who was clinically diagnosed with AD Alzheimer's
10:23:41 disease six months before PET. MRI showed
10:23:43 generalized cortical atrophy, but did not reveal
10:23:48 significant hippocampal atrophy."
10:23:51 Can you explain what that means?
10:23:53 **A.** Again, what is -- what would be the expected
10:23:55 range of findings with someone with Alzheimer's

10:23:58 disease? In this case, the range was all the way
10:24:01 from normal hippocampal volume to atrophic.
10:24:05 Certainly, Mr. Brockman's MRI scan
10:24:07 that I looked at there was atrophy of his
10:24:12 hippocampus. So he would fall -- easily fit within
10:24:15 that Alzheimer's disease group. You could place him
10:24:19 right in there, and add his imaging to the processed
10:24:22 imaging data and the result would be the same. So
10:24:24 he looked very much like what you would expect for
10:24:27 Alzheimer's disease patient, based upon the study.
10:24:31 **Q.** So in other words, Mr. Brockman fits the
10:24:34 profile for a demented patient cited in this study?
10:24:37 **A.** Correct.
10:24:49 **Q.** Dr. Whitlow, focusing solely on the
10:24:51 neuroimaging, what does the neuroimaging indicate
10:24:54 about Mr. Brockman's disease diagnosis?
10:24:56 **A.** Yep, so when you take all of the imaging
10:24:59 together, you take the MRI where volume has
10:25:02 progressed pretty rapidly from 2018 to 2021, you
10:25:07 take the pattern of hypometabolism that is in a
10:25:09 pattern of what you would expect for Alzheimer's
10:25:11 disease -- and which has progressed over a short
10:25:14 period of time -- and then you combine that with
10:25:17 amyloid positivity and you take all of that
10:25:19 together, you know, what a physician says, "Well,

what's the diagnosis here?"

And diagnoses are all about probabilities. So if I -- if you just -- if I just heard the description of that imaging and said, you know, what -- what group does that fit into? Well, it fits into a group -- you know, I would -- it would raise concern for dementia. I would say, "There's a high probability with a patient of that imaging profile comes from a population who has dementia."

So it raises concern for dementia. And, in particular, it raises concern for Parkinson's dementia.

Q. So based solely on the neuroimaging, the profile would be reflective of someone with Alzheimer's disease?

A. Yes, if I was giving a test to my fellows and I gave that pattern and I said, "What does that look like," they should say, "Well, that would raise concern for Alzheimer's disease."

Q. Understanding that dementia requires a clinical diagnosis -- and you focus on neuroimaging?

A. Correct.

Q. But focusing solely on the neuroimaging, what does the imaging indicate regarding Mr. Brockman's

cognitive function?
A. Right. You know, imaging cannot measure cognitive function. And individually, each piece is non-specific. But again, when you put it all together, when I look at imaging that looks like that with that amount of brain loss, accumulation of amyloid, and hypometabolism in that pattern, I would be very concerned that the patient that I'm looking at has cognitive disfunction. And not just mild cognitive impairment, I would be very concerned about dementia, and in particular Alzheimer's dementia.
Q. Okay. Focusing -- based on your experience and having viewed thousands of images, what does the neuroimaging alone indicate regarding the severity of Mr. Brockman's dementia?
A. Well, you know, given the amount of volume loss that occurred over a relatively short period of time, and in particular giving the hypometabolism that has progressed over five months, I would be concerned this is not just early dementia or mild dementia. I would be concerned about something more than that. That's what I would expect to see, you know, on cognitive -- cognitively.
Q. Thank you, Dr. Whitlow.

10:27:35 MR. MALONEY: Pass the witness.
10:27:36 THE COURT: Okay. We're going to take
10:27:37 our morning break right now. Let's go ahead and
10:27:40 break until 10:45, and then we'll get started again.
10:27:44 (Whereupon, a recess was held.)
10:54:52 THE COURT: Counsel, you may proceed
10:54:54 whenever ready.
10:54:54 **CROSS-EXAMINATION**
10:54:54 **BY MR. MAGNANI:**
10:54:59 **Q.** Good morning, Dr. Whitlow. How are you today?
10:55:01 **A.** Good morning. Very well.
10:55:02 **Q.** Okay. Have you testified before?
10:55:03 **A.** No.
10:55:04 **Q.** You said that about a third of the hours that
10:55:06 you billed in this case were billed within the last
10:55:08 week or so; is that right?
10:55:12 **A.** I couldn't tell you if it's a third.
10:55:14 **Q.** Well, I think you said ten first; right? You
10:55:19 have to say yes.
10:55:19 **A.** Oh, yes.
10:55:20 **Q.** And then after that you said another, like,
10:55:21 five to seven or something; is that right?
10:55:23 **A.** Yeah. So I mean, there's a range -- five to
10:55:25 seven, plus or minus two, so...
10:55:27 **Q.** So we're going to do math today. So ten and

10:55:30 five.
10:55:30 **A.** Fifteen.
10:55:31 **Q.** So about a third of that time was pretty
10:55:35 recently?
10:55:35 **A.** Something like that.
10:55:36 **Q.** Okay. So you've done some preparing for your
10:55:38 testimony?
10:55:39 **A.** Oh, yes. Yes, I have prepared for my
10:55:41 testimony.
10:55:42 **Q.** During your testimony, you used the term
10:55:44 standard of care --
10:55:45 **A.** Standard care.
10:55:45 **Q.** -- over half a dozen times; is that right?
10:55:48 **A.** Okay. That's correct.
10:55:48 **Q.** Do you think that this case is about what the
10:55:51 appropriate standard of care is?
10:55:54 **A.** No, I think the case is about --
10:55:57 **Q.** Well, I'm just asking if you think it's about
10:55:59 standard of care?
10:56:00 **A.** No, I don't think it's about standard of care.
10:56:02 **Q.** Okay. Clinical practice is pretty different
10:56:05 from forensic practice; would you agree?
10:56:08 **A.** I think that's -- I think it's hard to agree to
10:56:11 that because I think there's differences and
10:56:13 similarities.

10:56:13 **Q.** Okay. So there are some differences?
10:56:15 **A.** That are differences.
10:56:16 **Q.** Now, you are a clinician; right?
10:56:18 **A.** I am a physician, yep.
10:56:19 **Q.** In your clinical practice, you review -- I mean, would it be fair to say hundreds, if not thousands, of scans a year?
10:56:28 **A.** Correct.
10:56:29 **Q.** You don't see patients face-to-face?
10:56:31 **A.** No, I do see patients face-to-face.
10:56:33 **Q.** Can you describe your role with a patient face-to-face?
10:56:35 **A.** Sure. Yeah, so we do a lot of minimally invasive image-guided procedures. So, um, things like lumbar punctures, myelograms, image-guided head and neck biopsies. I did a lot of angiography in my day. So a lot of seeing a patient is what you would expect.

10:56:56 You meet a patient. You do a history -- take a full history from them. You ask them why they're here, what their chief complaint is --
10:57:03 **Q.** Just to interrupt. So a patient comes to a neuroradiologist to talk about their chief complaint?

10:57:08 **A.** Yes.
10:57:08 **Q.** Okay. And --
10:57:11 **A.** It's within our scope of practice, yes.
10:57:13 **Q.** I guess what I -- correct me if I'm wrong. I guess my understanding was that generally a patient would see, like, a neuropsychiatrist or neurologist, and that those doctors would rely on someone like you to consult on the imaging; do I have that wrong?
10:57:29 **A.** That's not incorrect, but the scope of our practice is beyond that as -- because part of the scope of our practice is actually seeing patients, talking to them, generating a history, physical exam, and performing procedures on them.
10:57:41 **Q.** Okay. So in any of your clinical practice -- it sounds like you spend a good amount of time with patients. Fair to say you never review substantial materials like you've reviewed in this case?
10:57:51 **A.** That would be incorrect. I do review substantial amounts of information on all of our patients, because we're beholden to everything about the patient in the medical record when we're generating our opinions about, you know, their imaging studies or about treating them.
10:58:05 **Q.** So in this case you've been retained to interpret some recent PET scans and MRI's; right?

10:58:12 **A.** Correct.
10:58:12 **Q.** Also some -- I guess an old DaTscan that you talked about?
10:58:15 **A.** Correct.
10:58:16 **Q.** You said you took about ten hours to review all of that stuff. Is that common to review so few scans?
10:58:21 **A.** Well, that's not the only thing I reviewed. I also reviewed the past medical histories -- all of the medical records that were provided to me as well, which were substantial.
10:58:21 **Q.** Okay. And so you are saying that's consistent with your clinical practice?
10:58:29 **A.** Yeah, to review clinical records in the context of --
10:58:29 **Q.** Sorry -- I'm just asking if what you did in this case is consistent with what you do in the clinic. That's my only question.
10:58:36 **A.** Yes.
10:58:38 **Q.** Okay. Now, in this case you -- do you have your reports with you, by the way, in case you need them?
10:58:40 **A.** They're out -- I don't have them directly in front of me.
10:58:43 **Q.** You might want them. So I don't know if --

10:58:57 well, I can ask you questions about them. You might
10:59:00 be more prepared to answer if you have them. I'll
10:59:03 throw that out there.
10:59:03 **A.** Sure.
10:59:05 **Q.** So what I am trying to do is -- you've studied
10:59:13 this stuff for an entire career. You know a lot
10:59:15 about imaging?
10:59:16 **A.** Mm-hmm.
10:59:17 **Q.** You know, some of us here might have studied
10:59:19 for a couple of weeks. We know a little bit about
10:59:21 imaging. What we're trying to do is take everything
10:59:24 in your brain, condense it, and present it to
10:59:26 someone who is trying to learn about imaging.
10:59:28 **A.** Got you.
10:59:29 **Q.** The goal is to be helpful and clarify.
10:59:32 **A.** Absolutely.
10:59:32 **Q.** So if I ask a question that's confusing or
10:59:35 misleading, please let me know.
10:59:36 **A.** Okay.
10:59:37 **Q.** But if I ask a clear question, can you answer
10:59:40 yes or no because it'll help the flow?
10:59:42 **A.** Yeah. Sure.
10:59:43 **Q.** Okay. So in your prep, you were explaining
10:59:45 cross-examination is a little different than direct
10:59:47 examination?

10:59:47 **A.** Mm-hmm.
10:59:50 MR. MAGNANI: May I approach the
10:59:50 witness, Your Honor?
10:59:51 THE COURT: You may.
10:59:52 MR. MAGNANI:
10:59:52 **Q.** Here are your reports.
10:59:53 **A.** Thank you very much. Appreciate that.
10:59:56 **Q.** So okay. Just to sort of outline -- you know,
11:00:00 there are some things where I'm going to try to
11:00:02 clarify some of the science that I hope is not too
11:00:05 controversial, but I want to make sure it's clear?
11:00:07 **A.** Sure.
11:00:07 **Q.** Sometimes, though, I'm going to try to explore
11:00:10 your potential for bias, okay?
11:00:11 **A.** Okay.
11:00:12 **Q.** And, you know, in a respectful way can we agree
11:00:16 this is all with respect here?
11:00:17 **A.** Yes, absolutely.
11:00:18 **Q.** Okay. One of the ways I'm going to do that is
11:00:19 by talking about some of the language that you use,
11:00:21 okay?
11:00:22 **A.** Okay.
11:00:22 **Q.** And so, if the language that you used you
11:00:25 think, upon reflection, is not very accurate, the
11:00:28 main goal is to just be clear and to make sure that

11:00:30 the Judge understands clearly, okay?
11:00:32 **A.** Sure. That makes sense.
11:00:33 **Q.** So it's not a criticism of you or anything like
11:00:36 that.
11:00:36 **A.** None will be taken.
11:00:37 **Q.** All right. Well, I mean, do you think that you
11:00:42 might be subject to any bias?
11:00:44 **A.** Um, it's very, very well known that all
11:00:46 physicians are subject to bias.
11:00:50 **Q.** And you -- in this case I know that you said
11:00:54 you commonly review records, but is it also true in
11:00:57 this case you read some declarations from attorneys?
11:00:59 **A.** Yes.
11:00:59 **Q.** And other things that you wouldn't typically
11:01:01 review?
11:01:02 **A.** That's correct.
11:01:03 **Q.** Would it be fair to say that the medical
11:01:05 records that you reviewed were from Baylor College
11:01:11 of Medicine?
11:01:11 **A.** That's correct.
11:01:11 **Q.** And starting from about March 2019, they
11:01:14 diagnosed mild to moderate dementia?
11:01:16 **A.** Yes.
11:01:17 **Q.** Fair to say you didn't review the indictment in
11:01:19 this case?

11:01:20 **A.** I don't recall that I saw the indictment.
11:01:22 **Q.** Well, if you don't recall -- just so you know
11:01:24 the rules, if something would refresh your memory,
11:01:26 and I gave you some things that might, you can
11:01:28 always say you don't remember and refer to your
11:01:30 reports. That's totally fine.
11:01:31 **A.** Okay.
11:01:32 **Q.** So is there anything you want to refresh your
11:01:35 memory about --
11:01:35 **A.** I don't remember specifically whether I
11:01:37 reviewed the indictment or not, but I can look at my
11:01:40 report and try to see if that's in there.
11:01:42 **Q.** Well, if I told you it wasn't would that
11:01:44 surprise you?
11:01:45 **A.** No, it wouldn't.
11:01:46 **Q.** You didn't review any of the Government's
11:01:48 filings in this case?
11:01:49 **A.** Not that I'm aware.
11:01:50 **Q.** Okay. And you didn't review any, for example,
11:01:54 e-mails of the Defendant -- that the Defendant wrote
11:01:58 showing a high degree of cognitive function
11:02:00 throughout 2020?
11:02:01 **A.** I do not recall seeing e-mails from the
11:02:03 Defendant.
11:02:10 **Q.** I know you did say -- to be honest, it was a

surprise to me -- you do a lot of work with your patients in clinical practice. But is it -- you are here because you are an expert in interpreting images; right?

A. That's one of the reasons I'm here, yes.

Q. Well, can you -- maybe I just don't understand it, but why is it important to review, like, all of those Baylor records before looking at the images? Can you just elucidate?

A. Yeah, so in medicine, we -- all physicians -- it's -- it's part of our mandate, if you will, to review all information that's available about our patients when making diagnoses or treating them. So it's not something specific to radiology. It's just all physicians review everything that's available to them in general practice.

Q. Okay. But I guess I don't understand. Why can't you look at the images and give your interpretation of the images?

A. The same reason you couldn't look at a physical exam, let's say, and just look at that in a vacuum because there's more to it. There's more information.

Q. So would it be fair to say that to help inform your view about the images and what they mean it was

11:03:22 helpful to have that other material?
11:03:24 **A.** Definitely. Material outside of the images
11:03:27 alone can factor in the interpretation of an imaging
11:03:31 study. For sure they can help guide, you know, your
11:03:33 opinions about imaging studies for sure.
11:03:35 **Q.** As you said, everybody has bias. Have you
11:03:38 questioned whether the selection of materials that
11:03:39 were given to you might have pushed you one way or
11:03:43 another?
11:03:43 **A.** Yeah, I did. I questioned whether there could
11:03:45 even be malingering. I questioned that in my mind.
11:03:48 **Q.** So for example, I want to show you -- it's
11:03:51 Maloney; right? First of all, I think you testified
11:03:55 you agree with the clinical radiologist's
11:03:57 impressions on everything; right?
11:03:59 **A.** Yeah. With -- with some caveats that I don't
11:04:03 believe that the radiologist who read the 2021 MRI
11:04:05 had really compared it to the 2018 result. So while
11:04:08 I agree with his overall impression, I think there's
11:04:11 additional information that he wasn't -- he didn't
11:04:13 have available to inform --
11:04:13 **Q.** Right. But so --
11:04:14 **A.** -- his decision.
11:04:14 **Q.** -- so you agree with all of the words on the
11:04:17 page, but sometimes you have something else to

11:04:20 contribute?
11:04:20 **A.** Yeah, that's perfect. Yes.
11:04:20 **Q.** That's why you are making money here; right, something else to contribute?
11:04:23 **A.** Yes.
11:04:24 **Q.** So when you read from the impressions on this one, which is Defense Exhibit 39, this is the March 2021 FDG-PET. Would it surprise you if you said findings are mild instead of findings are very mild?
11:04:38 **A.** It wouldn't surprise me.
11:04:39 **Q.** So if you read every other word on that page except the word very before mild, not a surprise?
11:04:41 **A.** No, it's -- it's -- yeah, it wouldn't surprise me if it said the findings are mild versus findings are very mild.
11:04:44 **Q.** So you -- in talking about the comparison -- well, let me ask you this. Do you agree that of all the tools that you have at your disposal, if you only had one you would want to go with the FDG-PET?
11:04:51 **A.** If I only had one tool at my disposal and -- sorry, no, I would not go with the FDG-PET.
11:05:04 **Q.** Which one would you go with?
11:05:10 **A.** History. History -- classic teaching in medicine is you can derive almost everything that
11:05:12
11:05:15

11:05:18 you need from history --
11:05:19 **Q.** But you are a neuroradiologist. Okay. Let me
11:05:21 ask this question --
11:05:21 **A.** Yes.
11:05:21 (Whereupon, the court reporter admonishes to not
11:05:25 interrupt.)
11:05:25 **Q.** I apologize. If there is a member -- if
11:05:28 there's a role for you to play on this team of
11:05:32 experts, is it your role to interpret the
11:05:37 neuroradiology?
11:05:38 **A.** I -- well, I would -- I would say -- I would
11:05:41 clarify that --
11:05:42 **Q.** Okay. You know what, I have a better question
11:05:44 to avoid all of this. Of the imaging that you
11:05:47 review --
11:05:47 **A.** Ah, okay.
11:05:48 **Q.** -- is the most informative one the FDG-PET?
11:05:52 **A.** I don't think I can answer that question. I
11:05:54 don't think anyone is necessarily more informative
11:05:59 than the other.
11:05:59 **Q.** Which is the most informative image to show
11:06:04 neurodegeneration?
11:06:05 **A.** Which one is the one to show -- because they
11:06:06 all -- the problem is they all show
11:06:08 neurodegeneration, so I'm struggling with the

11:06:09 question. Which one shows neurodegeneration the
11:06:12 most? That's really hard to say. They all show
11:06:17 neurodegeneration.
11:06:18 **Q.** And to be clear, my question is not which one
11:06:20 reveals the -- the greatest degree of
11:06:24 neurodegeneration. My question is if you haven't
11:06:25 seen anything in this case, which tests -- if you
11:06:28 had one test to order and you wanted to measure the
11:06:33 degree of neurodegeneration, which test would you
11:06:36 order?
11:06:37 **A.** Again, I'm struggling with it because, you know
11:06:41 -- you know, I'm struggling because one test
11:06:43 wouldn't give much information alone in a vacuum.
11:06:46 So I apologize. I'm not trying to be difficult, I'm
11:06:49 just struggling with trying to answer that. I
11:06:51 really don't know which one I would want.
11:06:53 Probably -- probably the MRI -- if
11:06:56 I had to answer, I would probably say the MRI
11:06:58 because -- and this is why -- because it could show
11:07:01 -- it could exclude other things that could be
11:07:04 causing dementia like brain tumors, like old strokes
11:07:08 or something like that. So I think it would be very
11:07:10 informative to exclude other common causes of
11:07:12 dementia.
11:07:14 So I would probably say MRI would

11:07:14 be one that I would choose. If I had nothing else,
11:07:17 I would probably go with an MRI.
11:07:19 **Q.** Your testimony is if you came to this case with
11:07:21 no background and you could order one brain study,
11:07:26 the one you would choose is an MRI?
11:07:27 **A.** Yes, if this case -- or even if I had a patient
11:07:30 that I was approached with, with a question of
11:07:32 dementia, the first -- the probably -- if I had to
11:07:34 choose one test, I'd probably choose an MRI because
11:07:37 it would be incredibly informative about excluding
11:07:40 other common causes of dementia.
11:07:41 **Q.** So the answer is yes; right?
11:07:43 **A.** Yes. So sorry.
11:07:44 **Q.** If I ask a simple question --
11:07:47 **A.** Yeah.
11:07:48 **Q.** -- but if you need to explain, raise your --
11:07:50 **A.** Yeah -- sorry. I was trying to explain.
11:07:52 **Q.** That's okay. So -- well, FDG-PET number two?
11:07:57 **A.** FDG-PET number two -- um, I would say, yes. I
11:08:02 would -- in the -- in the -- and I apologize. Yes,
11:08:06 I would. I can explain on that.
11:08:07 **Q.** Now, on your direct exam you said that your
11:08:10 comparison -- well, actually let me ask you about
11:08:12 the MRI first. So in your direct exam you talked
11:08:16 about the words normal and abnormal. This is one of

these areas where I think things can get confusing. If I'm 5'9", I'm normal height; would you agree?
A. I guess in my -- no, I don't -- I don't necessarily -- no, I think that's a hard thing to say. I mean, does it fall -- I guess -- I apologize. I should probably -- maybe if I explained how I think about things, maybe it could help.
Q. Really, I just -- we're trying to clear things up.
A. That's what I'm trying to do.
Q. I'm sorry about all of the talking over. When you say that brain shrinkage is abnormal, you do not mean that it's uncommon?
A. That would be correct. That I can agree on.
Q. So when you say amyloid depositions in the brain is abnormal, you do not mean that is uncommon?
A. Correct.
Q. So fair to say as we age our brains shrink?
A. Yes.
Q. And fair to say as we age some people develop amyloid depositions?
A. That's correct.
Q. So something can be common, but it -- to use medical terminology, abnormal does not necessarily

11:09:29 mean uncommon?
11:09:30 **A.** Um, abnormal does not necessarily mean -- well,
11:09:35 hold on for a second.
11:09:37 **Q.** Just do your thinking in your head.
11:09:40 MR. LOONAM: Objection.
11:09:41 THE COURT: Let the witness answer the
11:09:42 question, because you are guys are talking on top of
11:09:46 each other.
11:09:47 THE WITNESS: I apologize.
11:09:48 THE COURT: I mean -- not you. I mean
11:09:49 the examiner. You need to explain, and I need to
11:09:51 hear from you so take your time.
11:09:53 THE WITNESS: Okay. So common -- I
11:09:55 would not say that amyloid deposition in the general
11:09:57 population is common. I would say amyloid
11:10:00 deposition in the population with disease is common.
11:10:03 So that's the only clarification I would make.
11:10:06 It is not common to have amyloid
11:10:08 just generally in the population. In a subset of
11:10:12 the population that seeks medical care because they
11:10:14 have diseases it's common. So it's common in the
11:10:16 diseases population. Not -- I wouldn't say that we
11:10:18 could say it's common in the -- in just the general
11:10:21 population at large.
11:10:24 MR. MAGNANI:

11:10:24 **Q.** Let's stick with the MRI. I think that's a
11:10:26 little simpler. You talked about the Neuroreader®
11:10:29 report?
11:10:30 **A.** Yes.
11:10:30 **Q.** Do you know whether it was the Defense or the
11:10:32 Government experts that ordered the 2021
11:10:35 Neuroreader® report?
11:10:35 **A.** I don't know.
11:10:36 **Q.** Would it surprise you if it was the Defense?
11:10:38 **A.** Um, a little bit because I recommended not to
11:10:41 order it, because I don't think it's very useful.
11:10:44 **Q.** Is that because you have some problem with that
11:10:48 particular company? Like, are you a NeuroQuant guy,
11:10:52 or is this a brand loyalty thing?
11:10:55 **A.** No, because I don't use any brand of
11:10:58 commercially-available quantitative analysis in my
11:11:00 clinical practice. So it's more of an issue of --
11:11:03 sorry to use the word, but standard of care. It's
11:11:07 just not standard of care to use that for clinical
11:11:10 diagnosis.
11:11:10 **Q.** You went on, at length, about how one of the
11:11:13 problems you have with the Neuroreader® report is
11:11:15 that you don't know the population that the
11:11:18 patient's being compared to. Do you remember that?
11:11:20 **A.** Right, I don't have enough detail about that

11:11:22 population to make a determination about its
11:11:24 accuracy.
11:11:25 **Q.** So do you have any reason to believe that the
11:11:27 Neuroreader® company uses fetal alcohol, PCP-smoking
11:11:34 degenerates as part of their population?
11:11:37 **A.** No, but I don't know if they have hypertensives
11:11:40 -- people with hypercholesterolemia -- education
11:11:41 status, socioeconomic status, diet, growing up,
11:11:45 exercise, et cetera, which are more relevant to
11:11:48 brain volume than the things you mentioned.
11:11:49 **Q.** So the answer to that question would be you
11:11:52 don't know?
11:11:52 **A.** Well, maybe restate the question.
11:11:53 **Q.** My question was you don't have any reason to
11:11:56 believe that the sample of patients is a sample that
11:12:00 includes -- you know, that is overrepresented of
11:12:03 people with fetal alcohol syndrome, or drug use, or
11:12:06 incarceration status -- you don't have any reason to
11:12:09 believe that; right?
11:12:10 **A.** I don't have any reason to believe that they
11:12:12 would include those three specific populations.
11:12:14 **Q.** And on your direct exam -- as you were just
11:12:18 now, and that's why I was trying to cut you off --
11:12:19 **A.** Sure. Sure.
11:12:20 **Q.** -- you explained there are a lot of things that

11:12:22 can go into a sample group that might mess up the
11:12:25 sample group?
11:12:26 **A.** Absolutely.
11:12:26 **Q.** On your direct exam you said something along
11:12:29 the lines, "It would be different if you compared it
11:12:31 to a group of astrophysicists who do a lot of
11:12:34 exercise"; right?
11:12:36 **A.** Mm-hmm.
11:12:37 **Q.** You have to say yes, sorry?
11:12:39 **A.** Yes, sorry.
11:12:39 **Q.** But you don't have any reason, one way or
11:12:41 another, to believe that the Neuroreader® sample is
11:12:43 not a fair representation of the population at
11:12:45 large; do you?
11:12:46 **A.** I don't have any information to know what to
11:12:49 believe about the sample, so I can't say yes or no.
11:12:52 I don't know enough about the sample.
11:12:54 **Q.** So the question is you have no reason to
11:12:56 believe that this sample is not representative of
11:13:00 the overall population?
11:13:01 **A.** That's -- let me repeat that question, because
11:13:04 it seems like there's, like, double negatives or
11:13:08 something. So there's no reason to believe that
11:13:10 there's not -- there's no reason to believe that
11:13:13 there's not -- can you rephrase the question, I

guess?
Q. Neuroreader® is one of two companies that researchers use to analyze brain MRI scans; correct?
A. Correct.
Q. The other one is called NeuroQuant; right?
A. Correct, and there's more than that, though.
Q. But that's the Pepsi and Coke® -- those are the two big ones?
A. Not in my opinion. There's many, many vendors out there.
Q. Do you have any particular concerns about the population that Neuroreader® uses compared to the other ones?
A. Yes, because I don't know enough about it to understand the comparison group.
Q. So you just don't know?
A. I just don't know.
Q. According to the Neuroreader® report, would you agree that in 2021 Mr. Brockman's brain was normal?
A. No, I would not -- I would not agree that in 2021 his brain was normal.
Q. So my question is according to the Neuroreader® report, would you agree that it is normal?
A. I would -- I would disagree from the Neuroreader® report that it's normal.

11:14:12 **Q.** Okay. So just -- and I -- I have a copy I can
11:14:15 show you here.
11:14:16 **A.** Sure.
11:14:16 **Q.** And this is -- well, this I know is -- used
11:14:24 this before, so...
11:14:29 MR. LOONAM: Is it marked?
11:14:30 MR. MAGNANI: This one is not.
11:14:31 **Q.** Well, let me ask you this, Doctor, do you
11:14:33 recognize this?
11:14:34 **A.** I do.
11:14:34 **Q.** And is this the 2021 -- I'm sorry, August
11:14:38 Neuroreader® report?
11:14:40 **A.** Yes.
11:14:40 **Q.** According to that report, does it say that the
11:14:43 whole brain matter is in the 34th percentile?
11:14:47 **A.** Yes.
11:14:48 **Q.** Okay. And is it your testimony that being in
11:14:55 the 34th percentile is not normal?
11:15:02 **A.** My testimony is that I don't know what the 34th
11:15:05 percentile means. I can't really put it into
11:15:08 context, so I can't interpret 34th percentile.
11:15:12 I can't interpret in terms of what
11:15:14 that means for the general population or for
11:15:16 Mr. Brockman.
11:15:16 **Q.** So I want to make sure. Your testimony is that

11:15:18 you can't interpret what 34th percentile means for
11:15:22 the general population?
11:15:22 **A.** No, I can't interpret what 34th percentile
11:15:26 means in that report.
11:15:27 **Q.** Doesn't it mean that if there's 100 people that
11:15:31 Mr. Brockman would have the 34th smallest brain?
11:15:33 **A.** Well, it depends on the hundred people. So,
11:15:36 yes, that's correct, but it depends on the 100
11:15:38 people you are comparing it to. We don't know who
11:15:40 those people are, so I can't interpret that value.
11:15:43 **Q.** You made it very clear you don't know who these
11:15:45 people are. That's why I'm asking these questions,
11:15:47 like according to the report, okay?
11:15:49 **A.** Yeah, okay. I see what you are saying.
11:15:50 **Q.** So according to the report -- which I
11:15:52 understand you might disagree with -- the report
11:15:55 indicates that Mr. Brockman's brain as of, you know,
11:15:59 July 2021, was in the 34th percentile of the
11:16:02 population; correct?
11:16:03 **A.** Correct.
11:16:03 **Q.** Okay. So for the FDG-PETs --
11:16:07 **A.** Well, not of the general population. Of the
11:16:10 population they used.
11:16:11 **Q.** I'm asking what the report says.
11:16:12 **A.** Yeah, I know. But you said compared to the

11:16:14 population, and I guess I need some clarification
11:16:16 what you mean population. Do you mean the entire
11:16:18 population of the planet or the population they used
11:16:21 to compare?
11:16:22 **Q.** Do you think there's any confusion to that
11:16:24 point, Doctor?
11:16:25 **A.** I think there's a lot of confusion to that
11:16:27 point for me personally, because you said -- because
11:16:29 you said compared to the population. And I'm simply
11:16:33 asking do you mean the population of the planet, or
11:16:38 the population they used in the report? So just
11:16:40 need to have that clarification, I guess.
11:16:41 **Q.** You testified on direct that your comparison
11:16:44 between the two FDG-PET scans -- you said it raises
11:16:50 concern that the disease is progressing rapidly?
11:16:52 **A.** Mm-hmm.
11:16:53 **Q.** You have to say yes.
11:16:54 **A.** Yes, sorry.
11:16:55 **Q.** You also said it's, "More rapid than typical";
11:17:00 correct?
11:17:00 **A.** Correct.
11:17:00 **Q.** And you said, "Aggressive/progressive
11:17:05 neurodegenerative process"; correct?
11:17:07 **A.** Correct.
11:17:07 **Q.** So do you agree with all of those things?

11:17:09 **A.** Yes.
11:17:10 **Q.** And do you think those are accurate terms to
11:17:12 describe the change in the FDG-PETs?
11:17:13 **A.** Yes.
11:17:14 **Q.** Can you please turn to your -- well, let me ask
11:17:15 you this actually before we get there. I know that
11:17:19 you sort of took issue with some of the slides in
11:17:25 this case; is that right?
11:17:25 **A.** Yes, that's correct.
11:17:26 **Q.** Well, I've got one for you that's hopefully
11:17:29 less controversial.
11:17:31 **A.** Okay.
11:17:31 **Q.** Have you seen this before?
11:17:32 **A.** I have.
11:17:33 **Q.** Is this a comparison of the two FDG-PETs in
11:17:38 this case?
11:17:38 **A.** Yes.
11:17:38 **Q.** Are they using the same Z scores?
11:17:40 **A.** They are using the same Z-score.
11:17:42 **Q.** Would you agree this a fair comparison of the
11:17:45 two FDG-PETs in this case?
11:17:47 **A.** Um, I would need a little bit more information
11:17:49 to say that. Were they acquired on the same machine
11:17:53 or a different machine?
11:17:55 **Q.** If the answer is that you don't know, just say

11:17:57 that you don't know. My question is do you agree
11:18:00 that this is a fair comparison of the two FDG-PETs?
11:18:04 **A.** I guess I'm struggling, because in order for me
11:18:07 to say it's a fair comparison I would need to know
11:18:09 if it was done on the same machine or a different
11:18:12 machine.
11:18:12 **Q.** Okay.
11:18:12 **A.** So should I answer no, or...
11:18:15 **Q.** If you don't know, you should say you don't
11:18:18 know.
11:18:18 **A.** Well, okay.
11:18:18 **Q.** Okay. So my question is, is it a fair
11:18:21 comparison? Is your answer that you don't know?
11:18:24 **A.** I guess if the -- if the question is it is a
11:18:29 fair comparison -- um, I would say it's -- I would
11:18:33 say it's -- I would say it's a fair comparison,
11:18:35 yeah.
11:18:35 **Q.** Okay. And you've seen these before you
11:18:39 testified?
11:18:39 **A.** Correct.
11:18:39 **Q.** These are from Dr. Maria Ponisio's reports;
11:18:43 right?
11:18:43 **A.** Yes.
11:18:44 **Q.** And I think -- yeah. So I'm going to mark this
11:18:46 as Exhibit -- and move it in as Exhibit 170?

11:18:48 **A.** Okay.

11:18:53 MR. MAGNANI: Unless Mr. Maloney
11:18:56 objects.

11:19:00 MR. MALONEY: Objection, Your Honor.
11:19:01 Dr. Ponisio has not testified as to how these images
11:19:05 were created. Other than the Z-score, it sounds
11:19:07 like, and the fact it's based on the two FDG-PET
11:19:09 scans, we don't know anything else about these
11:19:11 images or how Dr. Ponisio created them. She was the
11:19:14 Government's retained neuroradiologist, and we don't
11:19:17 have any additional information about that imaging.

11:19:19 THE COURT: Okay. Was this information
11:19:21 reviewed by any of your experts in this matter -- I
11:19:26 mean, from the Prosecution?

11:19:28 MR. MAGNANI: Crucially, Your Honor, I
11:19:30 think the witness, who is an expert, said he
11:19:32 reviewed this information. So whether our experts
11:19:34 reviewed it I don't think is material. This witness
11:19:36 said he's reviewed the underlying material, and he
11:19:39 agrees this is a fair and accurate depiction
11:19:41 comparing the two PETs. So I think this would be
11:19:44 helpful for the fact finder, and this witness laid
11:19:47 foundation for its submission.

11:19:48 THE COURT: So, Mr. Maloney, has this
11:19:51 witness seen this before?

11:19:52 MR. MALONEY: He has seen this image.
11:19:54 I don't think he has any additional information,
11:19:56 other than the information we've covered by the
11:19:58 Z-score and the fact that Dr. Ponisio created that
11:20:01 imaging based on the two FDG-PETs.
11:20:03 THE COURT: Okay. But he's reviewed
11:20:04 it?
11:20:04 MR. MALONEY: He has reviewed it.
11:20:05 THE COURT: Okay. Objection's
11:20:07 overruled.
11:20:08 MR. MAGNANI:
11:20:08 **Q.** So now I'm going to show you this one. I know
11:20:11 you were very passionate about you really don't like
11:20:12 this one; right?
11:20:13 **A.** That's correct.
11:20:14 **Q.** Okay. Now, let me ask you, though, in general
11:20:17 you talked a lot about clinical practice?
11:20:19 **A.** Okay. Yes.
11:20:20 **Q.** For the record, this is Exhibit 143, which is
11:20:23 in evidence. You talked about, in your clinical
11:20:27 practice, you would not compare groups to
11:20:29 individuals; right?
11:20:36 **A.** I'm trying to recall what I said. I said in
11:20:41 medicine we don't treat groups, we treat
11:20:44 individuals. So in terms of how to boil that down

11:20:46 to yes or no, I guess -- repeat the question? I
11:20:51 apologize.
11:20:51 **Q.** Don't worry about what you said before. Just
11:20:53 focus on what I'm asking now. What I'm asking is in
11:20:55 your clinical practice you would not normally
11:20:58 compare something like this, an FDG-PET with a
11:21:00 patient to something like this; right?
11:21:03 **A.** Correct.
11:21:03 **Q.** And what these are -- I mean, you know the
11:21:06 sources of the two top rows; right?
11:21:07 **A.** Correct.
11:21:08 **Q.** And they're amalgamations created by
11:21:12 researchers in your field?
11:21:13 **A.** Correct.
11:21:13 **Q.** Sorry, I know the screen's not so great here,
11:21:16 but the top one is for patients with PD dementia?
11:21:19 **A.** Correct.
11:21:19 **Q.** And the second one is for patients with AD
11:21:22 dementia?
11:21:22 **A.** Correct.
11:21:22 **Q.** Now, you mentioned -- and, you know, if you
11:21:25 have to I guess you can try to explain. But is it
11:21:29 fair to say that the p-values used to create these
11:21:31 two amalgamations are the normal p-value that you
11:21:35 would see in these types of amalgamations in the

11:21:38 literature?
11:21:39 **A.** Yeah, they would be -- yes.
11:21:41 **Q.** Okay. And then, for the bottom you were
11:21:43 talking about the Z-score that was used to create
11:21:46 the bottom image; do you remember that?
11:21:47 **A.** I didn't talk about a Z-score. I talked about
11:21:50 a standard deviation.
11:21:51 **Q.** I apologize. And it was two standard
11:21:53 deviations; right?
11:21:54 **A.** Correct.
11:21:54 **Q.** You said it would be different if it was one or
11:21:57 four; right?
11:21:57 **A.** Correct.
11:21:57 **Q.** And would you agree that in your field two
11:22:00 standard deviations is what is typically used?
11:22:02 **A.** No, I would not agree with that.
11:22:04 **Q.** So what do you use when you are creating a
11:22:06 visual representation of an FDG-PET?
11:22:08 **A.** Um, are you asking what I would do when I
11:22:12 evaluate an imaging study?
11:22:14 **Q.** I'm asking -- yes. You are testifying you
11:22:17 would not use --
11:22:18 **A.** I would not use two standard deviations.
11:22:20 **Q.** So what would you use?
11:22:21 **A.** I would put -- I would take all of the imaging

11:22:24 data I have -- for example, in this case it'd be two
11:22:27 PET scans. So I would put the two PET scans side by
11:22:29 side, and then I would visually look for a
11:22:32 difference. And if I saw a difference, I would try
11:22:35 to put it into a mild, moderate, or advanced
11:22:39 category, but I might or might not be able to do
11:22:42 that.
11:22:42 And nothing that I would do would
11:22:44 be based on a standard deviation, because again it's
11:22:46 a qualitative visual assessment. I have no way of
11:22:50 knowing if it's one, or two, or three standard
11:22:53 deviations from the mean.
11:22:54 **Q.** I got a note we need to do a better job not
11:22:57 talking over each other, so I'll do my part.
11:23:00 **A.** I apologize.
11:23:00 **Q.** You talk a lot about your qualitative
11:23:12 observations; right?
11:23:15 **A.** Yes.
11:23:16 **Q.** And you talked about how the Neuroreader® --
11:23:17 that's not good for you; right?
11:23:20 **A.** That's not good for me or...
11:23:22 **Q.** It's not revealing to you of anything that we
11:23:25 can understand in this courtroom?
11:23:26 **A.** I would say that's not what I have said.
11:23:28 **Q.** Are you saying -- is it fair to say that you,

11:23:32 in general, are relying more on your qualitative
11:23:35 observations than anything quantitative?
11:23:37 **A.** Yes, I rely on my qualitative assessment.
11:23:42 **Q.** And in your brain, over all of the years
11:23:45 looking at all of the studies, do you have a pretty
11:23:48 good idea of what a person with dementia's brain
11:23:50 looks like when they have -- you know, whether it's
11:23:52 Alzheimer's disease?
11:23:53 **A.** Yes.
11:23:53 **Q.** And a pretty good idea of what someone with
11:23:56 PDD, Parkinson's disease dementia --
11:23:58 **A.** Not as much.
11:23:59 **Q.** Okay. But at least with Alzheimer's disease
11:24:01 you have a pretty good idea of what those images
11:24:04 should look like?
11:24:04 **A.** Yes.
11:24:04 **Q.** And do you understand the rest of us don't?
11:24:06 **A.** Yes.
11:24:07 **Q.** Okay. And it might be helpful for the Judge to
11:24:09 have something to understand what if looks like so
11:24:12 we don't just have to rely on what you are saying?
11:24:15 **A.** Um, I can understand that, yes.
11:24:16 **Q.** So did you prepare something that's more
11:24:19 illustrative of what a typical Alzheimer's brain
11:24:22 looks like?

11:24:23 **A.** Well, we have -- on the bottom row of
11:24:27 Mr. Brockman's brain, that would be typical.
11:24:29 **Q.** Okay. So I'm going to use another one of
11:24:39 these. I'll mark this as Exhibit 171 for
11:24:46 identification. Just to hide the suspense,
11:24:50 Dr. Whitlow, I'm using one from a report that you
11:24:52 wrote --
11:24:52 **A.** Okay.
11:24:52 **Q.** -- in a study that you wrote making a similar
11:24:55 amalgamation of Alzheimer's disease dementia. Do
11:25:00 you -- well, I'm guessing you can't read the
11:25:03 footnote. Do you -- here, I'll just tell you. It's
11:25:06 an article called *Wither the Hippocampus.*
11:25:10 **A.** Yes.
11:25:10 **Q.** You wrote that article?
11:25:11 **A.** Yes.
11:25:11 **Q.** In that article you created -- again, I
11:25:14 understand this is not clinical. We're now talking
11:25:15 in the research area?
11:25:16 **A.** Correct.
11:25:17 **Q.** You created an amalgamation to show what an
11:25:20 Alzheimer's disease dementia brain looks like;
11:25:22 right?
11:25:22 **A.** Yes.
11:25:23 **Q.** So is yours a fair depiction of what you expect

11:25:27 to see?
11:25:27 **A.** Yeah, I would say it looks very similar to
11:25:29 Mr. Brockman's. So, yes.
11:25:30 **Q.** Okay. So you are saying that -- so your answer
11:25:33 is yes?
11:25:34 **A.** Yes.
11:25:34 **Q.** And you are also saying that yours on the top
11:25:37 looks very similar to Mr. Brockman's; right?
11:25:39 **A.** Yes.
11:25:39 **Q.** Okay.
11:25:39 MR. MAGNANI: I move to admit
11:25:41 Government's 171.
11:25:43 MR. MALONEY: No objection, Your Honor.
11:25:44 THE COURT: Without objection, 171 is
11:25:46 admitted.
11:25:56 THE WITNESS: Could I -- oh...
11:25:58 MR. MAGNANI:
11:25:58 **Q.** Oh, yeah.
11:25:59 **A.** Would it be okay for me to clarify when I say
11:26:01 that the depiction -- it would depict a pattern, but
11:26:05 not a magnitude? The reason I say that is because
11:26:09 the slide I was shown was trying to say that the
11:26:13 magnitude of the red, um, was, um, different than
11:26:18 the magnitude of blue. I would want to say that's
11:26:21 not what I'm saying.

I am saying the pattern, the spacial distribution, is accurate for Alzheimer's disease. The magnitude of red and blue are irrelevant.

Q. Okay. I understand.

A. Okay. Sorry. I just wanted to make that point.

Q. So what you are saying is the amount of red here, and the amount of black in yours -- it's -- we should forget about that?

A. Yeah, it's not the amount. It's the -- it's -- it's the anatomical distribution.

Q. So just where?

A. Yes, where. That's correct.

Q. See how these things can confuse us?

A. Sorry. That's why I wanted to clarify.

Q. So back to your testimony about aggressive/progressive neurodegenerative process. I asked you before and I got a little sidetracked, but you said that you agree that's what you are seeing when you compare the two FDG-PETs; is that right?

A. That's right.

Q. Okay. I'm going to put that up again. So we're seeing aggressive/progressive neurodegenerative process; right?

11:27:21 **A.** But that's not the FDG-PET.
11:27:22 **Q.** I'm now showing you Exhibit 170. What did you
11:27:26 say?
11:27:26 **A.** This is not the FDG-PET.
11:27:27 **Q.** Okay. What is this?
11:27:29 **A.** This is a -- basically a statistical,
11:27:34 parametric map showing standard deviation between --
11:27:39 from the mean. So this is not what I used to make
11:27:41 my determination.
11:27:42 **Q.** Okay. So do you think this is helpful, though,
11:27:44 to a layperson in comparing the changes?
11:27:47 **A.** I don't know what's helpful to a layperson, but
11:27:51 I'm saying within my subspeciality of medicine I
11:27:55 don't use these kinds of images -- this had no basis
11:27:59 for my opinion, this image.
11:28:00 **Q.** I understand this had no basis for your
11:28:02 opinion. Our job is learning here, okay.
11:28:04 **A.** Yes.
11:28:04 **Q.** So let me ask you this -- well, don't you --
11:28:07 well, this is like -- well, fair to say that looking
11:28:10 at this first slide, you can see some progression
11:28:14 here?
11:28:14 **A.** Yes, quite a bit.
11:28:16 **Q.** And when you look at something different than
11:28:19 that, do you also see progression of what we're

11:28:21 looking at here?
11:28:22 **A.** Can -- maybe rephrase the question? I don't
11:28:27 understand the question.
11:28:27 **Q.** So, Dr. Whitlow, it's very confusing to us what
11:28:30 it is you are looking at that we don't have here in
11:28:32 court. And so, what I'm trying to do is take things
11:28:35 that we have in court and have you help us explain
11:28:37 so that we can all understand.
11:28:39 **A.** Do you have the -- the FDG-PET scans from
11:28:42 Mr. Brockman in court?
11:28:44 **Q.** Did you bring them?
11:28:45 **A.** No.
11:28:47 **Q.** Okay.
11:28:48 **A.** Does the Prosecution have them?
11:28:49 **Q.** Let me ask you, is this just not helpful?
11:28:53 Should we just not talk about this?
11:28:54 **A.** You can talk it, but it's not what I used to
11:28:57 form the basis of my opinion.
11:28:57 **Q.** But my question, though, is whether or not the
11:28:59 differences between the -- these two on the left are
11:29:03 comparable to the differences that you observed when
11:29:06 you looked at the FDG-PETs out of court?
11:29:08 **A.** I can't really tell you if they're comparable,
11:29:11 but they do show aggressive progression of the
11:29:13 disease.

11:29:14 **Q.** That's okay. If you can't, just say you can't.
11:29:16 **A.** Okay.
11:29:17 **Q.** Nothing to apologize for.
11:29:18 **A.** Sure.
11:29:19 **Q.** Okay. So the aggressive/progressive
11:29:21 neurodegenerative process is what we're talking
11:29:23 about. If you could look in your report --
11:29:30 actually, it's your second report. Do you have your
11:29:48 second report handy?
11:29:49 **A.** I do. I have the report dated October 29,
11:29:53 2020.
11:29:53 **Q.** Okay. And so, unless there's an objection I
11:29:57 have some highlights on my version. I think it'll
11:29:59 help guide us.
11:30:00 MR. LOONAM: No objection.
11:30:02 MR. MAGNANI:
11:30:02 **Q.** Showing you PET scan section on Page 2. In
11:30:05 your report is it right that you said, "Overall, the
11:30:08 anatomical pattern of diminished metabolic activity
11:30:12 is similar between the two recent FDG-PET scans,
11:30:15 though may have progressed slightly to involve more
11:30:19 of the brain"?
11:30:20 **A.** Yes.
11:30:20 **Q.** That's what you wrote?
11:30:21 **A.** Yes.

11:30:22 **Q.** Okay. And now you are saying we're looking at
11:30:24 an aggressive/progressive neurodegenerative process?
11:30:32 **A.** Yes.
11:30:32 **Q.** Do you see how the words like, "may have
11:30:34 progressed slightly" is a little different than what
11:30:36 you said in court today?
11:30:37 **A.** Well, I guess if you -- should I -- I guess if
11:30:39 you are saying it's a one-to-one relationship, yes.
11:30:41 But again, very small changes in brain can have a
11:30:44 profound impact on function. So the amount that it
11:30:48 changed, even though it was -- even though the
11:30:51 wording said slight progression, it's still -- it
11:30:56 still involved much more of the brain than it did
11:30:59 before.
11:31:00 And so taking that together, that's
11:31:01 -- that's -- that's quite profound. Um, that's
11:31:04 pretty aggressive.
11:31:05 **Q.** So what I'm asking is, is the difference
11:31:07 between the two that they may have progressed
11:31:11 slightly, or is it that we're looking an at an
11:31:15 aggressive/progressive neurodegenerative process?
11:31:18 **A.** We're saying both. We're saying they may have
11:31:20 progressed slightly, which shows an
11:31:23 aggressive/progressive neurodegenerative because of
11:31:24 the amount of brain it's involving, and the change

11:31:27 over a relatively short period of time. It's really
11:31:29 the change over the short period of time that raises
11:31:33 concern about an aggressive/progressive process.
11:31:36 **Q.** Do you commonly review PET scans from the same
11:31:39 patient that are only five months apart?
11:31:41 **A.** No.
11:31:41 **Q.** I want to move you also -- by the way -- well,
11:31:47 you also testified about the amyloid PETs; right?
11:31:50 **A.** Yes.
11:31:50 **Q.** This is one where you testified on direct, "We
11:31:53 don't know what normal is"; do you remember that?
11:31:55 **A.** Yes.
11:31:56 **Q.** And you talked about how amyloid accumulation
11:31:59 is "Abnormal"?
11:32:00 **A.** Yes.
11:32:01 **Q.** Okay. You know, we did talk about this
11:32:03 already, but I think you said -- I apologize if I'm
11:32:06 repeating -- but it's very common for people who are
11:32:09 80 years old to have amyloid in their brain; right?
11:32:12 **A.** It's common for patients who have disease who
11:32:14 seek medical care to have it, but we don't -- we
11:32:17 don't know enough about the 80-year-olds that don't
11:32:21 come to the hospital whether that's a correct
11:32:22 statement or not.
11:32:32 **Q.** Now, do you agree that you can't -- cannot

11:32:36 diagnose dementia with a brain scan alone?
11:32:39 **A.** Agreed.
11:32:45 **Q.** Now, you talked about if you could only order
11:32:48 one scan to try to determine someone's level of
11:32:51 brain damage you would order the MRI; right?
11:32:54 **A.** Yes.
11:32:54 **Q.** But your number two was the FDG-PET?
11:32:56 **A.** I'd have to think about it again. This is such
11:32:59 a hypothetical scenario that it's hard to wrap my
11:33:02 mind around it, but I guess, yeah. I would -- I
11:33:06 think I would order MRI one, FDG-PET two in this
11:33:11 hypothetical scenario.
11:33:13 **Q.** Where would an amyloid PET come on the list?
11:33:16 **A.** I think that would be number three.
11:33:17 **Q.** Is it fair to say an amyloid PET does not show
11:33:23 neurodegeneration?
11:33:24 **A.** I don't think that's accurate.
11:33:25 **Q.** In an FDG-PET we're measuring brain activity;
11:33:29 right?
11:33:29 **A.** Yes.
11:33:29 **Q.** But looking at metabolism?
11:33:32 **A.** That's correct.
11:33:32 **Q.** In an amyloid PET, we're just measuring how
11:33:35 much of a certain protein has accumulated in the
11:33:37 brain; right?

11:33:38 **A.** That's correct.
11:33:38 **Q.** So we're not measuring brain function with an
11:33:41 amyloid PET?
11:33:42 **A.** That's correct. You are not measuring brain
11:33:44 function with amyloid PET; correct.
11:33:46 **Q.** So just -- and I do -- like I said, I do want
11:33:50 to go through your reports and talk about some of
11:33:52 the language.
11:33:53 **A.** Okay.
11:33:53 **Q.** And I think you said you've never testified.
11:33:56 So have you ever written an expert report in a court
11:33:58 case before?
11:34:00 **A.** Um, I did for this, yes.
11:34:03 **Q.** So -- sorry. I mean before this case, had you
11:34:06 ever written an expert report?
11:34:08 **A.** Um, yeah. I had written other expert reports
11:34:11 for Forensic Panel.
11:34:13 **Q.** Okay. So in your work writing expert reports
11:34:15 for The Forensic Panel, do you write these reports
11:34:17 by yourself?
11:34:18 **A.** Yes.
11:34:19 **Q.** Okay. So all of the language in your report is
11:34:21 your own language?
11:34:22 **A.** Yes.
11:34:24 **Q.** All of it?

11:34:25 **A.** Yes.
11:34:26 **Q.** Do your reports -- well, let me just ask you. In your first report, you list a bunch of sources
11:34:40 that you reviewed?
11:34:43 **A.** Yes.
11:34:44 **Q.** Did you write out all of those sources?
11:34:44 **A.** Did I write out all of the sources? You mean,
11:34:47 did I reference them?
11:34:50 **Q.** No, I'm just trying to understand, like, if you
11:34:51 copied and pasted this from somewhere else, or if
11:34:54 you actually wrote down all of the sources?
11:34:57 **A.** I didn't cut and paste anything from a source
11:34:59 into my, um, report -- except for the reference.
11:35:02 **Q.** Okay.
11:35:05 **A.** So I went to PubMed, cut the reference, and
11:35:06 pasted it in the report to show what I was
11:35:08 referencing.
11:35:11 **Q.** So when you are talking about PubMed, you mean
11:35:11 the references on the last page?
11:35:14 **A.** Yeah, the references -- the references on the
11:35:15 last page, the citation. I didn't type out -- I
11:35:18 didn't manually type out the citation. I did cut
11:35:20 the citation and paste it in.
11:35:23 **Q.** Don't worry, you are safe. What I'm asking
11:35:25 about, though, is on the first and second pages
11:35:27

11:35:29 where you list the sources that you relied on. What
11:35:32 my question is, is did you -- were you given a bunch
11:35:35 of sources and then you typed all of this out, or
11:35:37 were you given this list and then pasted it in?
11:35:39 **A.** No. No, so I took -- I took, um -- so I can
11:35:42 explain what I did. I took all of the imaging
11:35:44 studies, and then created a header for each one. So
11:35:49 I typed one, two, three, four and then typed out --
11:35:53 um, and typed in the words that I chose, which might
11:35:56 be slightly different than what's in the -- than
11:35:58 what's on the report.
11:35:59 **Q.** So I just want to show Item 22. So it says,
11:36:05 "Peer oversight call with Thomas Guilmette, Michael
11:36:09 Welner, Christopher Whitlow, Marc Agronin, Timothy
11:36:12 Shepherd," and then gives the date July 30, 2021.
11:36:16 I understand you might have made a
11:36:17 mistake when you were testifying, but are you -- I
11:36:19 want -- like, did you write this?
11:36:22 **A.** "Peer oversight" -- I mean, my recollection is
11:36:24 that I typed all of these dates and lines of
11:36:31 information.
11:36:31 **Q.** So it's common for you to write your own name
11:36:34 like that in the third person?
11:36:35 **A.** Yes, "Christopher Whitlow."
11:36:37 Yeah, that's how I referred to

11:36:39 myself. So if you looked at my biosketch, yes,
11:36:43 that's common within my field.
11:36:47 **Q.** Okay. And I think you already said this, but
11:36:50 so your -- your reports don't contain any language
11:36:53 supplied by other people?
11:36:55 **A.** Not that I'm aware of -- um, not that I'm aware
11:36:59 of.
11:36:59 **Q.** I would hope you would be aware.
11:37:02 **A.** Yeah, I would, too.
11:37:02 **Q.** Okay.
11:37:04 **A.** But could someone have pasted a word or
11:37:06 something in there that I overlooked? I guess
11:37:08 that's possible.
11:37:09 **Q.** So, Dr. Whitlow, that would be a big problem if
11:37:11 that happened, okay?
11:37:12 **A.** Okay.
11:37:12 **Q.** But do you understand why?
11:37:13 **A.** Why is that?
11:37:14 **Q.** Well, it's because you are here to testify as
11:37:17 an expert.
11:37:17 **A.** Yes.
11:37:18 **Q.** And it's important that the words in your
11:37:20 report are ones that you wrote; do you understand
11:37:22 that?
11:37:22 **A.** Yes.

11:37:23 **Q.** Okay. So I just want to make sure if you are
11:37:26 just guessing, but do you think someone else might
11:37:28 have put language in your report?
11:37:30 **A.** I mean, it's conceivable that someone, um,
11:37:33 edited the way I wrote something, and so -- could
11:37:38 have, you know, written it in a different way than I
11:37:40 did. But -- so I guess -- I guess that's possible.
11:37:43 I can't really say -- I don't recall whether that
11:37:46 actually happened, but it would be -- maybe I said a
11:37:49 meeting between Christopher Whitlow and someone
11:37:52 else, and someone could have rearranged it in a
11:37:54 different way.
11:37:55 So that's possible that my report
11:37:57 could have been edited, that is true. I would say
11:38:00 that there's -- there's a good chance my report was
11:38:05 edited. But in terms of who created it, I created
11:38:08 my report.
11:38:08 **Q.** So what makes you say that there's a good
11:38:12 chance your report was edited?
11:38:13 **A.** Because it was circulated to The Forensic
11:38:16 Panel, and I believe the people in the peer review
11:38:19 saw my report.
11:38:20 **Q.** What you are saying is you wrote a report, and
11:38:22 then you distributed it to the colleagues in The
11:38:23 Forensic Panel?

11:38:23 **A.** Yes.
11:38:23 **Q.** And after that you don't know what happened to it?
11:38:25 **A.** Well, after that there was -- there were edits of my -- of the report that I wrote, and it was edited, yes.
11:38:34 **Q.** Do you know who supplied those edits?
11:38:35 **A.** I -- I -- I don't know for sure, but I would say it's the peer review group -- people on the peer review group.
11:38:37 **Q.** Did you have a discussion with these people about those edits?
11:38:40 **A.** Um, we talked about -- we talked about some edits and some questions. So the peer review process is that you have a group of multidisciplinary experts. And, you know, the report is -- it's like a peer review publication.
11:38:44 So you distribute the report, just like you would distribute a paper. It's reviewed by a multidisciplinary group. You get together and discuss it, questions that -- questions that people had, areas where people think that things should be clarified.
11:38:45 And, um -- and so definitely I took that into consideration, and added to my report
11:38:48
11:38:51
11:38:54
11:38:56
11:39:00
11:39:02
11:39:04
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11:39:15
11:39:19

11:39:23 based upon our conversation. It was also
11:39:25 distributed, so parts of what I had written could
11:39:29 have been deleted, or the language could have been
11:39:35 changed to streamline the final product, just like
11:39:38 you would with any other peer review.
11:39:40 **Q.** Just like with any other peer review?
11:39:43 **A.** Correct.
11:39:43 **Q.** But in academia, aren't there -- well, there
11:39:45 are like single-blind or double-blind peer reviews
11:39:47 in academic journals in your field?
11:39:48 **A.** Single-blind or -- I am not familiar with that
11:39:51 terminology, but papers are sent for review by
11:39:54 experts.
11:39:55 **Q.** Right. But the experts that they're reviewed
11:39:57 by are experts in your field?
11:39:58 **A.** Um, not always. There are -- it's -- it can be
11:40:02 multidisciplinary. It could be, for example,
11:40:04 neurologists, neuroradiologists.
11:40:06 **Q.** So the purpose of peer review in an academic
11:40:09 context is to make sure people with different
11:40:11 opinions can tear something down to --
11:40:13 **A.** Yes.
11:40:13 **Q.** -- to make sure it withstands that -- that it
11:40:16 withstands scrutiny in the field; right?
11:40:18 **A.** Yes.

11:40:18 **Q.** But in this case all of the people that you are
11:40:22 calling peer reviewers are paid by the Defense;
11:40:24 right?
11:40:24 **A.** Correct.
11:40:25 **Q.** And the Defense has a narrative in this case;
11:40:27 right?
11:40:27 **A.** I don't know if the Defense has a narrative or
11:40:30 not, but...
11:40:31 **Q.** Are you saying you don't know if the Defense
11:40:32 has a point of view on the questions --
11:40:35 **A.** I believe they have a point of view, but I was
11:40:37 saying I don't know, you know, what their narrative
11:40:41 is.
11:40:41 **Q.** In your first report you mentioned one call --
11:40:43 **A.** Yes.
11:40:44 **Q.** -- with the peer reviewers. It's Item 22. We
11:40:47 talked about it before.
11:40:48 **A.** Correct.
11:40:49 **Q.** This is the one where you refer to yourself in
11:40:50 the third person --
11:40:51 **A.** Yes.
11:40:51 **Q.** -- in the middle of the sentence. Doctor, I --
11:40:54 we really have to do better at not talking over each
11:40:57 other.
11:40:57 **A.** I apologize.

11:40:59 **Q.** So -- but now it sounds like what you are
11:41:02 saying is you had a lot more interaction with the
11:41:05 other people than what you just said; is that fair?
11:41:08 **A.** I said that we had a peer oversight call, and
11:41:13 that we had a discussion during that call of the
11:41:16 report. And then -- and then the peer reviewers
11:41:21 provided feedback over a period of time, not in the
11:41:25 context of that single call.
11:41:26 **Q.** Doctor, this call was on July 30th; right?
11:41:29 **A.** Um, yes.
11:41:30 **Q.** And the amyloid PET was not done yet; right?
11:41:33 **A.** The amyloid PET? I -- I would have to see the
11:41:37 dates, yes. So the amyloid PET scan may not have
11:41:41 been conducted yet; correct.
11:41:43 **Q.** And the FDG-PET of August was not done?
11:41:49 **A.** Correct.
11:41:50 **Q.** And the MRI -- let me ask you, what did you
11:41:58 guys discuss on that July 30th call?
11:42:00 **A.** It's been a long time. We discussed the data
11:42:02 that we had to date.
11:42:05 MR. MALONEY: Objection, Your Honor.
11:42:07 The amyloid PET scan had been conducted on
11:42:11 July 28th. The peer review call Mr. Magnani's
11:42:14 representing was conducted on July 30th.
11:42:16 THE COURT: Okay. Then the witness

would be able to say that.

You may continue.

MR. MAGNANI:

Q. Do you remember what you talked about on that July 30th call?

A. I don't remember all of the specifics.

Q. And it sounds like we were just corrected; right? The amyloid PET was done before that call?

A. Yes.

Q. And does that mean that the amyloid PET was done before you consulted with the panel?

A. Well, if the amyloid PET was done before the call, then it would have been done before we consulted about it.

Q. So that call was the first time that the panel asked you about anything about this case?

A. The panel asked me anything about the case? Um, the peer review panel is what you mean -- or forensic panel?

Q. Is there a -- is there a difference --

A. Yeah. I mean, I -- I see The Forensic Panel as, you know, a group. I guess I was -- I was referring to the peer review group as -- as the peer review kind of panel. But I guess I see your point that the peer review group was retained by The

Forensic Panel, so in that case it would all be The Forensic Panel.

So, yeah, we discussed all of the information that we had to date.

Q. And so, my question was did anybody on the Defense team talk to you before you ordered the amyloid PET -- did they consult with you about whether that would be a --

A. Yes. Yes.

Q. Okay. So your testimony is that they talked to you before July 28th when that was ordered?

A. Yes. We -- um, I recommended ordering the amyloid PET to The Forensic Panel.

Q. Do you know why those other -- that previous consultation is not in your report?

A. No, I don't know why I -- I don't know why that's not in my report.

Q. Is there something special about this meeting on July 30th that we should know about?

A. Yes, so this was an organized call where we were going to meet about all of the data that we had to date, and the elements of the report that I was drafting to go over. You know, what -- where are the data that we have to date? What are the opinions that have been generated? And then, to get

11:44:24 oversight from this multidisciplinary team to have a
11:44:29 chance to weigh in and review the materials
11:44:31 objectively.
11:44:32 You know, the whole purpose here is
11:44:34 to review data and opinions through the lens of
11:44:37 objectivity using sort of scientific principles of
11:44:40 review. So this was a -- this was not just a --
11:44:43 like, some sort of a one-off consultation. This was
11:44:46 an organized event where we had a very specific
11:44:49 mandate to review all of the information that we had
11:44:52 and discuss it, ask questions, review, modify, and
11:44:58 have a -- have an organic exchange.
11:45:00 **Q.** Have you submitted your report to the panel for
11:45:03 their review before that call?
11:45:06 **A.** Oh, gosh. I certainly had not submitted my
11:45:12 final report, for sure. How much I had submitted --
11:45:15 what I had submitted at the time I -- I -- I don't
11:45:19 remember.
11:45:20 **Q.** So --
11:45:20 **A.** Oh, go ahead. I'm sorry.
11:45:21 **Q.** So you -- at some point, though, you gave them
11:45:24 a draft?
11:45:24 **A.** At some point a draft was circulated.
11:45:27 **Q.** And then at some point they sent you back with
11:45:29 comments?

11:45:29 **A.** Yes.
11:45:29 **Q.** And do you remember -- did you accept all of those comments?
11:45:32
11:45:33 **A.** No, I didn't accept all of them. Um, I didn't accept all of the comments, no.
11:45:37
11:45:39 **Q.** Okay. But I guess really what I'm wondering is you seem to have some -- you know, it seemed like you weren't too sure if at the end of the day whatever your final was is the same final we have here?
11:45:41
11:45:45
11:45:47
11:45:49
11:45:49 **A.** No, yeah. I think -- I think there's -- certainly I distributed my report, and there were edits made to my report. I think what I was trying to convey is I wrote that report. And, yes, it could -- it was most certainly edited in the context of, you know, peer review.
11:45:52
11:45:55
11:45:57
11:46:00
11:46:03
11:46:05 **Q.** Okay.
11:46:05 **A.** For sure.
11:46:06 **Q.** That's why I just want to go over with you if there's something you say like, "I don't agree with that," that's okay?
11:46:10
11:46:13
11:46:14 **A.** Okay.
11:46:14 **Q.** The importance is to be truthful now and give us your best effort at explaining these things, okay?
11:46:17
11:46:19

11:46:19 **A.** Certainly.
11:46:20 **Q.** Okay. So in the first paragraph of your first
11:46:23 report you wrote that, "Mr. Brockman is charged in a
11:46:29 complex indictment with details and history that
11:46:32 require him to be actively engaged in informing his
11:46:35 attorneys with reliable and valid information, to be
11:46:38 making decisions, and to be guiding the attorneys
11:46:41 through records and evidence for which they can only
11:46:43 partly inform their preparations.
11:46:46 "His capacity to inform his attorneys
11:46:48 and to engage the mental and physical rigors of
11:46:51 trial is in question, and a court hearing is
11:46:54 anticipated."
11:46:56 **A.** Yes.
11:46:56 **Q.** So is that your language?
11:46:57 **A.** Um, that -- that language is probably an
11:47:01 amalgamation of peer review.
11:47:03 **Q.** Is that language that -- is that your opinion
11:47:06 about what the indictment says?
11:47:08 **A.** That's mine. That's my understanding.
11:47:11 **Q.** And before you said that you didn't think you'd
11:47:14 even read the indictment; right?
11:47:15 **A.** I can't recall that I specifically read the
11:47:17 indictment or not. I just can't remember.
11:47:18 **Q.** So would it be fair to say that the description

of the indictment is not something that -- that's not your description?
A. Um, yeah. That's an amalgamation of our peer review process for sure.
Q. So -- and I'm just trying to understand what's yours and what's not?
A. Okay.
Q. Let me ask you this. Do you stand by that description of the indictment?
A. Yeah, I would stand by the description. Because, you know, that's a report that was generated by me with input from peer review. So it's amalgamation of the peer review process.
And so, in the context of discussing the case and discussing all of the details, um, I -- you know, then I agree with that statement.
Q. And when -- when you say that the indictment is complex and it requires -- I mean you say it requires active engagement. You say it requires the Defendant to make decisions and to guide the attorneys through records and evidence, is that your opinion about what the Defendant has to do to be competent in this case?
A. I would say -- yeah, that -- that's a good

11:48:22 reason to have an expert to help guide attorneys
11:48:25 through records and evidence.
11:48:26 **Q.** So I'm not asking about an expert. I'm asking
11:48:29 about the Defendant -- a client?
11:48:30 **A.** Oh, the client. Okay.
11:48:32 **Q.** So here what your report says is it says what's
11:48:36 required of the client, the Defendant, that the
11:48:39 client is required to guide their attorneys through
11:48:42 evidence and things like that. And what I'm asking
11:48:45 is, is that your opinion about what's required for a
11:48:49 client in a criminal case to be able to do?
11:48:51 **A.** Let me review my report here, because some of
11:48:56 it is cut off there.
11:49:01 **Q.** I'm sorry, you can adjust me, too.
11:49:03 **A.** Oh, yeah. I think that I would agree that in a
11:49:11 -- in this kind of a court hearing that -- yeah,
11:49:19 that he -- that the Defendant would need to be
11:49:21 actively engaged in informing attorneys, yes. I
11:49:27 would think that would be required of any defendant.
11:49:29 **Q.** Okay. So that's your opinion?
11:49:30 **A.** Yeah, I think the Defendant should be able to,
11:49:34 you know, actively engage and inform attorneys. I
11:49:38 think defendants should be able to do that, yes.
11:49:49 **Q.** Okay. Sticking on this first report, we talked
11:49:51 about these Baylor records that you reviewed before.

11:49:55 You know, is this your language that, "An extensive
11:49:59 workup from highly reputable neuroscience
11:50:02 specialists at Baylor University School of Medicine
11:50:05 has established a diagnosis of Parkinson's disease"?
11:50:08 **A.** It's my language informed by the peer review
11:50:11 process. So, you know, definitely -- so, yes.
11:50:15 **Q.** And so, you know, I understand that this was a
11:50:18 collaboration, but really what's important now is
11:50:21 that we know what you think --
11:50:23 **A.** Yes.
11:50:23 **Q.** -- and what your opinions are.
11:50:24 **A.** Okay.
11:50:25 **Q.** So when I'm asking these questions, really what
11:50:28 I'm just trying to understand is if that's -- like,
11:50:31 one, if you wrote it. I guess if you are not sure
11:50:34 about specific language --
11:50:35 **A.** No, I'm not saying that exactly. What I'm
11:50:38 saying is that I crafted the report, and then the --
11:50:41 and then in the peer review process, um, it was
11:50:44 discussed and informed by the peer review process.
11:50:48 It was edited by the peer review group, um, just
11:50:52 like any other research paper that I write that's a
11:50:56 team effort.
11:50:57 And that at the end of the day,
11:50:58 it's the product I put my name on, and therefore

11:51:00 everything in it I agree with.
11:51:02 **Q.** Okay.
11:51:03 **A.** But, you know, all of that is informed by peer
11:51:06 review process.
11:51:07 **Q.** And so, you are saying this is just like any
11:51:09 other research report that you do?
11:51:10 **A.** Not -- it's similar to other research reports
11:51:13 in that there's a peer review element.
11:51:15 **Q.** Okay --
11:51:16 **A.** And it's a team effort.
11:51:17 **Q.** But you knew at the time you wrote this report
11:51:21 that the Parkinson's disease diagnosis was not in
11:51:24 dispute; right?
11:51:25 **A.** Um, yeah. I think I -- I -- thinking back, I
11:51:30 -- I think that's correct, yes.
11:51:32 **Q.** Okay. But did you know that there's some
11:51:34 dispute about whether the Baylor team accurately
11:51:37 diagnosed the Defendant back in 2019?
11:51:39 **A.** I do recall a conversation where, again, we
11:51:42 were talking about -- clearly there was a
11:51:45 neurodegenerative process at play, and that there
11:51:50 was concern for Alzheimer's disease. And I recall
11:51:53 saying, "Well, if there's concern for Alzheimer's
11:51:55 disease" -- I remember thinking about, you know,
11:51:57 what goes into the diagnosis of Alzheimer's disease,

11:52:00 with amyloid PET being one of those elements.
11:52:07 **Q.** So let me ask you this hopefully simple
11:52:10 question. You reviewed the Baylor records; correct?
11:52:12 **A.** Yes.
11:52:13 **Q.** Do you agree with the diagnosis as of
11:52:15 March 2019, that the Defendant had mild to moderate
11:52:18 dementia at that time?
11:52:19 **A.** Mild to moderate dementia? Well, first of all
11:52:23 let me say that there were quite a lot of records.
11:52:26 And, um -- and, you know, I don't -- I don't
11:52:29 specifically remember that 2019 diagnosis. So, you
11:52:37 know, I would have to think about that.
11:52:39 Can you -- your question was in
11:52:41 2019 they had a diagnosis of mild cognitive
11:52:45 impairment; is that what you said?
11:52:46 **Q.** That's not what I said.
11:52:47 **A.** Okay. Sorry.
11:52:48 **Q.** Just take it -- let's take it slow. My
11:52:50 question is you just said that you read the Baylor
11:52:53 records?
11:52:53 **A.** I did.
11:52:57 **Q.** And you know the Baylor doctors diagnosed
11:52:59 Mr. Brockman with mild to moderate dementia in 2019?
11:53:01 **A.** Okay. I do know that.
11:53:03 **Q.** My question is do you agree with that

11:53:05 diagnosis?
11:53:06 **A.** I would say, um -- do I agree with that
11:53:08 diagnosis? Um, yeah, I would say in 20 -- I would
11:53:14 say that's conceivable that in 2019 they've that
11:53:16 that -- that would be correct. So, yes. I would
11:53:19 say, yes. I agree with that.
11:53:21 **Q.** Okay. So what I'm wondering -- like, when you
11:53:24 describe the doctors as highly reputable
11:53:27 neuroscience specialists, is that -- tell me if I'm
11:53:31 wrong. It sounds like you are trying to bolster
11:53:33 them to support the fact you agree with their
11:53:36 conclusions?
11:53:36 **A.** Well, I guess what I'm trying to say there is,
11:53:39 um, give some context for the people who are giving
11:53:42 their opinions and why they -- why they would have
11:53:44 been consulted, just like we did at the beginning of
11:53:47 my testimony to establish their credentials.
11:53:49 **Q.** Now, one of the other sources of information
11:53:52 that you relied on in your report is a 2017 e-mail
11:53:56 between the Defendant and Dr. Yudofsky. Do you
11:53:59 remember that e-mail?
11:54:02 **A.** I do not remember that e-mail. So if you have
11:54:04 it available, you could refresh my memory.
11:54:11 **Q.** It's Item 19 on your list.
11:54:13 **A.** Yes.

11:54:14 **Q.** So who gave you that e-mail to review?
11:54:16 **A.** I believe it was the case manager at Forensic Panel.
11:54:18 **Q.** Who is that person?
11:54:19 **A.** Joanna Fiorentini.
11:54:20 **Q.** And so is it your testimony that Ms. Fiorentini is the person that gave you all of these materials?
11:54:25 **A.** That's my recollection. But I would -- I would say that could I have received another piece of information -- no. I guess she didn't give me all of the information, because I believe some of it was sent directly from Methodist, I believe. For example, some of the imaging studies on disc, I believe, were sent directly from Methodist -- I believe. It's my recollection.
11:54:28 **Q.** Doctor, I'm just going to interrupt you. No one cares where you got the imaging studies from.
11:54:30 **A.** Okay. You were asking, so...
11:54:32 **Q.** Remember I said I wanted to explore the potential of bias?
11:54:35 **A.** Oh, yes. Yes.
11:54:37 **Q.** So there's something called selection bias; right?
11:54:40 **A.** Yes.
11:54:42 **Q.** Do you understand that the materials that you
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11:55:03

were shown and not shown might lead to selection bias?
A. Yes, I understand that.
Q. So the imaging is the imaging. Let's put that aside, okay?
A. Okay.
Q. What I'm asking is besides that, is it your testimony that got these materials -- I don't remember her name, but the person at The Forensic Panel?
A. Yes, the case manager at Forensic Panel. Yes, I would say it's accurate to say the vast majority of the information came from her.
Q. And what were you told about this 2017 e-mail?
A. What I was told about it? I don't recall -- I don't recall any -- any specific instructions about the e-mail. My recollection is there were e-mails that basically said, you know, "Here are materials, please review."

But I -- and so I don't -- I don't recall if there was any specific instruction to attend to this e-mail more than any other piece of information.
Q. Do you know who Dr. Stuart Yudofsky is?
A. I -- I don't know him personally.

11:56:09 **Q.** But were you told anything about him?
11:56:12 **A.** Not -- I don't remember being told anything about him specifically.
11:56:16 **Q.** Okay. Can you talk about how did this e-mail work itself into your report in your conclusions?
11:56:22 **A.** So again, I got a -- an e-mail with -- with -- so I got an e-mail with a link to a folder that had a massive amount of information in it. And so, the first thing that I did was just -- because it was so much information --
11:56:36 **Q.** So, Doctor, sorry to cut you off. I understand that -- you know, the way the documents were transmitted to you is not important.
11:56:43 **A.** Okay.
11:56:43 **Q.** So the -- my question is basically what -- how did you use this e-mail in informing your opinion?
11:56:50 **A.** Got you. So I just read all of these documents. And it's a lot of material. Um, and I -- so I reviewed it.
11:56:59 **Q.** Okay. And do you remember anything about it?
11:57:02 **A.** I honestly don't remember anything specific about it. Um, but did review all of the records. And then, from there kind of selected, you know, information to inform my decision.
11:57:14 **Q.** Okay. And I want to sort of switch gears here

11:57:17 a little bit. So before -- I apologize for being
11:57:21 dis -- I'm not trying to disorient you. We were
11:57:24 talking before about how you can't diagnose dementia
11:57:28 with a scan alone; correct?
11:57:29 **A.** Correct. That's right.
11:57:30 **Q.** And we talked about how there's basically two
11:57:33 different measures that we have here that both give
11:57:37 us a window into the degree of neurodegeneration in
11:57:41 the Defendant's brain?
11:57:43 **A.** Um, I'm sorry. Repeat the question.
11:57:45 **Q.** There's a lot of different scans we have in
11:57:47 this case; right?
11:57:48 **A.** Correct.
11:57:49 **Q.** And it's really the MRI and the FDG-PET that
11:57:51 the best indicators of neurodegeneration?
11:57:54 **A.** Um, no. I wouldn't -- I wouldn't say that
11:57:57 they're the best. I think they all have value in
11:58:00 different ways.
11:58:01 **Q.** Okay. Didn't you testify before if you could
11:58:03 only order one scan --
11:58:05 **A.** Yes.
11:58:05 **Q.** -- to show neurodegeneration --
11:58:07 **A.** I did. I'm sorry. I'm so sorry.
11:58:10 **Q.** So if you could only order one, you would order
11:58:12 the MRI; right?

11:58:14 **A.** Yes.
11:58:14 **Q.** And the second one that would be the second most informative in your view would be the FDG-PET?
11:58:16
11:58:18 **A.** Yes.
11:58:19 **Q.** Okay. So those are the two best scans we have to inform the degree of brain damage in this case; right?
11:58:22
11:58:25
11:58:26 MR. MALONEY: Objection, Your Honor. Misstates the testimony. That is not what the witness said.
11:58:28
11:58:30
11:58:30 THE COURT: Okay. Objection overruled. The witness knows what he said and what he didn't say. The Court remembers the testimony, so I give free reign with respect to directing -- cross-examining expert witnesses.
11:58:32
11:58:34
11:58:39
11:58:42
11:58:47 MR. MAGNANI:
11:58:48 **Q.** You should think about this. I just want to make sure, in your view, what are the two most reliable types of brain scans to measure neurodegeneration that we have in this case?
11:58:50
11:58:53
11:58:56
11:58:58 **A.** So I would say the question that I was posed with is if in a hypothetical situation --
11:59:01
11:59:04 **Q.** Stop. Stop. Forget about what happened before. Forget about the question that was posed, I'm just asking in this universe of brain scans that
11:59:06
11:59:09

11:59:11 we have, is it your opinion that the most
11:59:14 informative are the MRI and the FDG-PET?
11:59:18 **A.** Um, again it's -- we're getting into a
11:59:22 hypothetical question with a nuanced answer. So I
11:59:26 just want to make sure I'm being accurate in
11:59:28 answering this in the way that I intended on
11:59:31 answering it. So, um -- so I -- and I don't know
11:59:34 what's the appropriate methodology here. But I
11:59:39 guess the -- what my recollection was that I was
11:59:42 asked a question.
11:59:42 I said no individual -- we don't
11:59:44 use imaging studies in a vacuum. I would never have
11:59:48 one, and that all of them are important for
11:59:51 different reasons. And that I -- I had a hard time
11:59:54 saying what would be the most important. Then you
11:59:56 said, well, if I could only choose one, which one
12:00:00 would it be?
12:00:01 And I said, "Well, that's very
12:00:03 hypothetical, but I guess from my perspective I
12:00:06 would say if I could only choose one I would choose
12:00:09 MRI, because that way I could exclude other causes
12:00:12 of dementia such as brain tumors, strokes" and that
12:00:20 sort of thing.
12:00:20 But I wasn't trying to say MRI is
12:00:22 most accurate for depicting neurodegeneration. But

12:00:24 I was trying to say if I was a physician faced with
12:00:27 a patient, and I was only given a hypothetical
12:00:30 situation where I could only have one imaging study,
12:00:32 what would be the most helpful?
12:00:35 I would say MRI, because it
12:00:37 excludes other types of dementia.
12:00:39 **Q.** Doctor, do you think I am trying to confuse
12:00:42 you?
12:00:42 **A.** I feel a little bit like you are trying to
12:00:44 confuse me.
12:00:44 **Q.** I'm not trying to mislead or confuse you. What
12:00:47 I'm trying to do is get you to tell everybody -- we
12:00:50 have a lot of different scans in this case. What I
12:00:52 am asking you is what is the most useful one for
12:00:55 measuring the degree of neurodegeneration?
12:00:57 **A.** If the question is the one that's the most
12:01:02 helpful for measuring neurodegeneration, again I'm
12:01:05 back to saying I don't really think there is one
12:01:08 that is best. I just don't think there's one that's
12:01:11 best for neurodegeneration.
12:01:12 **Q.** So it's your testimony that you just don't know
12:01:16 --
12:01:16 **A.** Yeah, I would say --
12:01:19 **Q.** So, yeah. Let me finish the question. I know
12:01:21 you know where I'm going with the question, but just

12:01:24 wait. So it's your testimony of the scans reviewed
12:01:26 in this case, you don't know which one is the most
12:01:29 informative of neurodegeneration?
12:01:32 **A.** I would say that I don't -- so I don't know
12:01:37 which one is the most sensitive for measuring
12:01:41 neurodegeneration. I think -- what I'm saying is
12:01:44 that they all have intrinsic value, and they're all
12:01:47 different.
12:01:49 I guess what I'm trying to say is
12:01:51 they're different. They're measuring different
12:01:52 things, so you can't say one is better than another
12:01:55 because they're giving you different pieces of
12:01:56 information. One is about function. One is about
12:01:59 structure. Both of them reflect neurodegeneration.
12:02:02 Can I say one is better than
12:02:04 another? I don't think so.
12:02:05 **Q.** Doctor, we're -- all I'm trying to ask you is
12:02:09 if the two most probative of neurodegenerative scans
12:02:15 are the MRI and the FDG-PET. Is that -- would you
12:02:18 agree?
12:02:19 **A.** Well, I would -- I would -- I would agree that
12:02:21 there's three really important imaging scans for,
12:02:25 um, evaluating dementia. I would say it's MRI,
12:02:30 FDG-PET, and amyloid --
12:02:30 **Q.** I'm not asking about evaluating dementia --

12:02:32 **A.** Okay. For neurodegeneration I would say those
12:02:34 three would be very important for measuring
12:02:37 neurodegeneration.
12:02:38 **Q.** Didn't you testify before the amyloid PET does
12:02:41 not measure neurodegeneration?
12:02:42 **A.** I testified that the amyloid PET measures a
12:02:47 proteinopathy in the brain.
12:02:49 **Q.** Does the amyloid PET measure neurodegeneration?
12:02:52 **A.** You asked me does amyloid PET measure, um,
12:02:57 function, and I said, no, it doesn't measure
12:03:00 function. But as a measure of neurodegeneration, I
12:03:03 do believe it reflects a neurodegenerative process,
12:03:08 because it detects amyloid plaques in the brain.
12:03:11 **Q.** Let's break this down. I'm not asking about
12:03:14 whether it detects a neurodegenerative process. I'm
12:03:16 asking about how -- we agree Mr. Brockman is
12:03:19 suffering from neurodegeneration; right?
12:03:21 **A.** Correct.
12:03:22 **Q.** That neurodegeneration manifests in two ways;
12:03:25 right? Well, let me ask it this way. The
12:03:28 neurodegeneration manifests by volume loss; right?
12:03:31 **A.** That is one manifestation of neurodegenerative
12:03:35 change; correct.
12:03:35 **Q.** We measure volume with an MRI; right?
12:03:38 **A.** That's correct.

12:03:38 **Q.** The other way it manifests is a reduced
12:03:41 metabolic uptake of sugar in the brain; right?
12:03:43 **A.** Yes, we can agree there.
12:03:45 **Q.** And we measure that with an FDG-PET; right?
12:03:47 **A.** That's correct.
12:03:47 **Q.** Now, the fact that amyloid is accumulating in
12:03:50 parts of his brain is not a measurement of his
12:03:53 degree of neurodegeneration; would you agree?
12:03:58 **A.** I -- I will say I don't know if I can answer
12:04:02 that, because that's an area of active research now
12:04:06 what amyloid means. Okay -- so I don't know. I
12:04:09 don't know.
12:04:09 **Q.** And that's fine if you don't know, but of these
12:04:12 three tests are you saying that you do not know
12:04:15 which two of them are the best at measuring the
12:04:18 degree of neurodegeneration?
12:04:21 **A.** I think that, um -- which two are the best at
12:04:26 neurodegeneration? The way you are asking the
12:04:29 question, I -- I don't know. I mean I -- I would
12:04:32 say that -- are those the best at measuring
12:04:36 neurodegeneration? Golly.
12:04:40 They are good at measuring
12:04:42 neurodegeneration. Are they -- I guess I'm -- maybe
12:04:45 it would be helpful to try to get to kind of what --
12:04:48 you know, are you -- are you saying that MRI and PET

12:04:53 have value that -- measuring neurodegeneration that
12:04:58 amyloid doesn't have? Then, yes, I would say
12:05:01 definitely do have value that the amyloid PET
12:05:03 doesn't have in showing those two manifestations of
12:05:07 neurodegenerative disease.
12:05:09 But the accumulation of amyloid is
12:05:11 not normal. And, um, it -- it reflects an abnormal
12:05:14 process that is initiated by neurodegeneration --
12:05:19 THE COURT: Let him finish. Let him
12:05:22 finish.
12:05:22 By "You," I mean you. Sorry.
12:05:25 THE WITNESS: No, sorry. Sorry.
12:05:26 THE COURT: No. No, he keeps stepping
12:05:28 over you.
12:05:28 THE WITNESS: I'm doing the same, so I
12:05:31 apologize.
12:05:31 So again, you have to ask yourself
12:05:33 why do people have amyloid in their brain? It's not
12:05:36 normal. It shouldn't be there. It's -- and it's
12:05:39 believed that accumulation of amyloid is -- is a
12:05:43 manifestation of a neurodegenerative process. So I
12:05:46 guess that's why I'm struggling with saying, you
12:05:48 know -- trying to say that there's not value in --
12:05:53 in understanding that that -- that there's no value
12:05:56 in the assessment of neurodegeneration with an

12:06:00 amyloid scan.

12:06:01 I have a hard time saying it
12:06:03 doesn't provide any information about
12:06:05 neurodegeneration. I say it provides a different
12:06:06 kind of information about pathologic process that
12:06:10 would probably fall under the category of
12:06:12 neurodegeneration.

12:06:12 **Q.** And so, just to be clear your testimony is that
12:06:15 when we're talking about the MRI, the FDG-PET and
12:06:19 the amyloid PET, your testimony is that you do not
12:06:23 know which two of those are most informative for
12:06:26 measuring neurodegeneration?

12:06:30 **A.** For measuring neurodegeneration? Again -- you
12:06:36 know, as a clinical neuroradiologist I don't measure
12:06:40 neurodegeneration. So I can't -- can't say that I
12:06:42 can answer that question accurately.

12:06:44 **Q.** So I'll move on. I don't want to try to push
12:06:47 you out of your comfort zone here.

12:06:50 **A.** Yeah.

12:06:51 **Q.** You would agree that it's possible for people
12:06:53 to have abnormal FDG-PET findings, but still be
12:06:57 cognitively normal; correct?

12:06:58 **A.** Um, I think that's a very -- that's -- that's a
12:07:03 nuanced question. Yes. But is it probable? No,
12:07:07 it's not probable.

12:07:08 **Q.** Let's take them one question at a time.
12:07:10 **A.** Okay.
12:07:10 **Q.** So is it possible for people to have abnormal FDG-PET findings, but still be cognitively normal?
12:07:17 **A.** Again, medicine deals in the realm of probability. So while it might be possible, it's very unlikely. Just like the patient had a normal PET scan but had Alzheimer's disease.

So it's also possible to have a normal PET scan and have Alzheimer's disease. Neither one of those would be very probable, and they wouldn't be common. So I think, you know, again it's -- medicine deals in the realm of probability.

12:07:40 **Q.** So the answer to my question is, yes, it's possible?
12:07:42 **A.** Yes, it's possible.
12:07:44 **Q.** Okay. Thinking about sort of the different types of brain, what's the number one that you associate with memory?
12:07:52 **A.** Um, the areas of brain that are most associated with memory --
12:07:57 **Q.** Number one, asking you to rank stuff, Doctor?
12:07:59 **A.** Temporal lobe.
12:08:01 **Q.** Number two?

12:08:02 **A.** Number two involved in memory? Frontal lobes.
12:08:04 **Q.** Three?
12:08:06 **A.** Um, gosh. You know, I don't know that I could
12:08:09 go beyond that. That seems a very artificial way of
12:08:14 boiling down brain in a very -- a way that's overly
12:08:18 simplistic, I think.
12:08:19 **Q.** So in patients with Alzheimer's disease, what
12:08:21 area of the brain do we see early -- fair to say in
12:08:30 patients with Alzheimer's disease, amyloid
12:08:32 accumulates in the hippocampus?
12:08:34 **A.** No, amyloid accumulates in the brain all over
12:08:38 in patients with Alzheimer's disease.
12:08:40 **Q.** Are you saying it doesn't accumulate in the
12:08:41 hippocampus?
12:08:41 **A.** No, the hippocampus is part of the brain. So
12:08:44 if it occurs in all parts of the brain, by
12:08:48 definition it would occur in the hippocampus as
12:08:50 well.
12:08:50 **Q.** Would you agree the hippocampus is widely
12:08:53 recognized as an area of early change in patients
12:08:55 with Alzheimer's disease?
12:08:56 **A.** The current -- no. The current literature
12:08:59 deviates from just focusing on the hippocampus. If
12:09:01 you look at the most recent literature in the
12:09:04 Alzheimer's disease world, they talk about a -- um,

12:09:09 a temporal/parietal meta-ROI. So what's being been
12:09:15 recognize is in Alzheimer's disease it's not just
12:09:18 the hippocampus. It's portions of the temporal
12:09:21 lobe, parietal lobe, cingulate hippocampus. And
12:09:25 it's -- it's this cluster of regions that seems to
12:09:28 be important. It is not just the hippocampus.
12:09:31 And so, if you look in the recent
12:09:34 literature, people aren't -- there's much more
12:09:37 emphasis on this distributed -- these distributed
12:09:41 anatomic regions that form this, um -- um,
12:09:47 temporal/parietal meta-ROI, than people focusing on
12:09:47 hippocampus.
12:09:50 Although, I will say historically
12:09:54 people focused on the hippocampus a lot.
12:09:56 **Q.** Historically, like, ten years ago?
12:09:58 **A.** I would say so.
12:10:00 **Q.** And by people, you mean you?
12:10:01 **A.** I would say myself.
12:10:02 **Q.** And we talked about *Withered the Hippocampus*?
12:10:05 **A.** Yes.
12:10:05 **Q.** That's the name of the paper you wrote?
12:10:06 **A.** That's right.
12:10:07 **Q.** And in that report the first sentence is, "The
12:10:09 hippocampus is widely recognized as an area of early
12:10:12 change in Alzheimer's disease"?

12:10:14 **A.** Yes, but research moves fast.
12:10:15 **Q.** By the way, I do have -- you know, if you want
12:10:18 to look at this, but I'm going to move on, okay?
12:10:20 **A.** Sure.
12:10:20 **Q.** So this paper, we should forget it?
12:10:23 **A.** I didn't say that.
12:10:23 **Q.** Well, that part of it you are saying is not up
12:10:26 to date?
12:10:26 **A.** No, I'm saying that strictly focusing on the
12:10:30 hippocampus is out of date. Now people focus on
12:10:32 more than just the hippocampus and they focus on a
12:10:34 temporal/parietal meta-ROI, and that's something
12:10:38 that's just come about in the last several years.
12:10:41 That's the nature of science that it's always
12:10:44 progressing.
12:10:45 **Q.** Okay. Well, yeah, let's get back to this MRI.
12:10:49 So -- and I'll just go back to your report. This is
12:10:53 one of those things you testified. Do you see where
12:10:56 I've highlighted? This is your report, Page 2 at
12:11:01 the bottom. This is where you say, "You appreciate
12:11:06 diffuse cerebral volume loss."
12:11:09 Did you write that?
12:11:11 **A.** I can just turn to the -- let me turn to the --
12:11:15 so this is the second report from October --
12:11:19 **Q.** No.

12:11:19 **A.** The first report?
12:11:20 **Q.** First report, Page 2. Let me know -- you can
12:11:23 direct me on the screen if you'd like?
12:11:25 **A.** That's okay. It's just easier to just read it
12:11:29 here. So brain MRI scan dated November 2nd, 2018.
12:11:44 Yes.
12:11:44 **Q.** And sorry, just to make it's clear. So in your
12:11:46 report -- your first report, Page 2, you wrote that
12:11:48 you "appreciate diffuse cerebral volume loss"?
12:11:52 **A.** Yes.
12:11:53 **Q.** You testified on direct you agreed with the MRI
12:11:55 study; right?
12:11:56 **A.** Yes.
12:11:56 **Q.** And you also testified on direct that you would
12:11:58 also add the fact that you see, "Diffuse cerebral
12:12:03 volume loss?"
12:12:05 **A.** Yes, I see diffuse cerebral volume loss.
12:12:09 **Q.** Okay. So this an example of where you would
12:12:10 agree with the report, but you have something to
12:12:12 add?
12:12:12 **A.** Yeah, because my -- I -- he was saying he
12:12:15 didn't see any disproportionate lobar atrophy, but I
12:12:19 would say it's a little more nuanced in that there
12:12:23 was diffuse cerebral volume loss.
12:12:27 **Q.** When you compared the MRI's -- well, let me ask

12:12:28 you this. For the 2018 one, what was your baseline
12:12:32 to determine if there had been loss?
12:12:36 **A.** Well, it's, um, experience of seeing multiple
12:12:41 MRI's over time, and knowing what the brain should
12:12:45 look like.
12:12:45 **Q.** Okay. So it's not that you are comparing this
12:12:47 to an early point in time of the Defendant; right?
12:12:50 **A.** Correct.
12:12:51 **Q.** You are just saying, "I'm looking at the this
12:12:53 snapshot in time, and it looks like smaller than you
12:12:57 would expect"?
12:12:57 **A.** Correct.
12:12:58 **Q.** But we talked about how the Neuroreader® put
12:13:00 him in about something like the 40 percent range?
12:13:02 **A.** I think you said something like that, or you
12:13:04 might have said 30-something, yes.
12:13:06 **Q.** But -- and we don't have to get back into that,
12:13:08 but your view is, like, forget the Neuroreader®.
12:13:10 You are looking at it and you can see brain loss?
12:13:14 **A.** Correct.
12:13:15 **Q.** Okay. And then, on the third page this is
12:13:28 where you compare the two. So do you see here --
12:13:35 I'm sorry. Number 5?
12:13:38 **A.** Yes.
12:13:39 **Q.** So this is now where you compare them and you

12:13:43 say that again comparing them you note loss; right?
12:13:46 **A.** Correct.
12:13:46 **Q.** Okay. We talked about before -- or you talked
12:13:49 about before on direct about some of the problems
12:13:52 with comparing two MRI scans; do you remember that?
12:13:55 **A.** I remember a conversation about the problems
12:13:57 with qualitatively comparing two MRI scans, yes.
12:14:01 **Q.** Okay. And by the way, not to disorient you,
12:14:07 but I'm now going to go to your second report on
12:14:09 Page 4.
12:14:09 **A.** Okay. Second report, Page 4.
12:14:11 **Q.** And here you talk about how -- do you see at
12:14:17 the top it says, "The data demonstrates brain
12:14:23 volumetric loss from the 2018 MRI to the 2021 MRI
12:14:33 scans"?
12:14:34 **A.** Yes.
12:14:34 **Q.** Okay. So the use of the term, "The data
12:14:39 demonstrates" -- just to be clear, you are not
12:14:42 comparing Neuroreader® reports; right?
12:14:44 **A.** No. No.
12:14:44 **Q.** What do you mean when you say the data?
12:14:47 **A.** Well, the MRI imaging study -- we consider
12:14:50 those data. So I guess that's a term used in my
12:14:58 field where we talk about imaging studies, and those
12:15:00 are the data.

12:15:01 **Q.** So you testified about how you can't compare
12:15:04 the -- a 2018 and a 2021 Neuroreader®; right?
12:15:08 **A.** Correct -- well, I mean you can. There's just
12:15:11 limitations when you do that, and I don't think it's
12:15:13 a good idea to do it.
12:15:15 **Q.** I think we all agree it's not a good idea. So
12:15:18 one of the reasons why it's difficult with these two
12:15:20 is because of the difference in slice size; right?
12:15:23 **A.** Um, no. That wasn't the problem that I cited
12:15:26 for why you wouldn't want to compare two
12:15:30 Neuroreader® reports.
12:15:30 **Q.** My question is forget about why you wouldn't
12:15:32 want to compare them. I'm just saying is one of the
12:15:34 reasons why there's a danger in comparing them the
12:15:38 -- the two in this case -- is one of the dangers
12:15:41 that there's a different slice thickness in each
12:15:44 MRI?
12:15:44 **A.** I don't think that -- I mean, every difference
12:15:47 is important, but that's not -- I hadn't -- I hadn't
12:15:50 thought of it that way. I don't know that the slice
12:15:53 thickness is particularly relevant.
12:15:55 **Q.** Okay. So what are the things that are relevant
12:15:58 in comparing the two Neuroreaders® that you think we
12:16:01 should be concerned about?
12:16:02 **A.** Yes. So the ones that I would be really

12:16:04 concerned about is when you have two different
12:16:07 magnets -- again, there are just these giant
12:16:11 magnets. When they're manufactured, um, they do
12:16:14 something called tuning the magnet.
12:16:16 So again, you are -- it's -- it's
12:16:19 -- it's a circle magnet, and the magnetic field is
12:16:22 circulating through the bore of the magnet. You are
12:16:26 doing things to modify that field to generate a
12:16:30 really good -- really good image quality for --
12:16:33 specifically-tuned to the eyes so that you can see
12:16:37 the brain.
12:16:39 **Q.** So --
12:16:39 **A.** And the problem with that is that as you are
12:16:42 tuning it for each individual scanner, um, there are
12:16:44 -- there are these things called field
12:16:47 inhomogeneities. This inhomogeneous magnetic field
12:16:52 -- oh, gosh, how can I say it?
12:16:53 **Q.** I want to stop you before you start talking
12:16:55 about the subatomic particles of hydrogen atoms and
12:16:59 how magnets measure them, okay --
12:17:01 THE COURT: Okay. Do you have an
12:17:02 objection? Because there's not a question on the
12:17:04 table yet.
12:17:05 MR. MALONEY: Yes, Your Honor. He
12:17:06 asked him what his opinion is, and he's trying to

12:17:08 give an example of the factors relevant to him in
12:17:11 understanding how to interpret a brain MRI.
12:17:13 So he's explaining the factors
12:17:14 relevant to him, and he's continuing with that
12:17:16 conversation, and he's not being permitted to
12:17:18 continue.
12:17:19 THE COURT: Well, I think I agree with
12:17:21 you. I think what you are trying -- and I hear what
12:17:25 saying. I think what you are trying to do is focus
12:17:28 so we can get through this before tonight.
12:17:31 MR. MAGNANI: Yes.
12:17:31 THE COURT: So I understand the
12:17:32 objection. It's overruled. But let's keep moving,
12:17:35 because we're already now in lunch time.
12:17:38 MR. MAGNANI:
12:17:38 **Q.** I apologize -- look, I'm going to try not to
12:17:41 interrupt you, but if I do -- if there's something
12:17:44 important that you think I missed, even if it's five
12:17:47 questions ago, please raise your hand and tell us.
12:17:49 **A.** Okay. You are not offending me by interrupting
12:17:52 me. I'm doing the same, so I apologize.
12:17:54 **Q.** Let me ask you, is basically the problem --
12:17:58 we've got different hardware?
12:18:01 **A.** Yeah, that is a problem -- that we have
12:18:03 different hardware is a problem for quantitative

12:18:07 imaging, not qualitative imaging.
12:18:09 **Q.** Okay. So you talked about how the MRI machines
12:18:10 -- again, we're not getting into subatomic hydrogen
12:18:15 particles?
12:18:15 **A.** Okay.
12:18:15 **Q.** But MRI machines create data, and that data is
12:18:18 recorded as DICOM data; right?
12:18:20 **A.** Yes, that's -- yes, it is saved as DICOM data.
12:18:24 **Q.** So two different MRI machines both do scans,
12:18:28 and they both create their own DICOM data?
12:18:33 **A.** That's a very unusual way of thinking. DICOM
12:18:38 is just a format like doc, doc. So that's like
12:18:42 saying each computer creates a different doc, doc
12:18:45 format, which is true. I guess if you want me to
12:18:49 explain it I can, but --
12:18:51 **Q.** Let me just ask you this. The machine captures
12:18:53 a lot of data; correct?
12:18:55 **A.** Correct.
12:18:55 **Q.** The data is stored in a format called DICOM?
12:18:59 **A.** Correct.
12:19:00 **Q.** Once we have that data, it's not going to
12:19:03 change; right?
12:19:04 **A.** Correct.
12:19:04 **Q.** So the data is the data; correct?
12:19:07 **A.** Correct.

12:19:08 **Q.** Okay. So the two machines create different
12:19:11 data, and they're both stored in the DICOM format;
12:19:17 correct?
12:19:17 **A.** Correct.
12:19:17 **Q.** Now, can you take that DICOM data and send it
12:19:20 to a company like Neuroreader®; right?
12:19:22 **A.** Correct.
12:19:22 **Q.** And what Neuroreader® will do is they'll
12:19:25 compare it to -- as you pointed out -- an unknown
12:19:28 population; right?
12:19:29 **A.** Yes.
12:19:29 **Q.** And basically what they'll do is they'll
12:19:33 measure that DICOM data against the DICOM data of a
12:19:36 sample size; right?
12:19:37 **A.** Correct.
12:19:38 **Q.** Okay. In the old days, the only way to do this
12:19:40 was to take that DICOM data, and render it through
12:19:43 software that could make a visualization of it;
12:19:47 correct?
12:19:47 **A.** I don't think that's -- no, that's not my
12:19:50 understanding. I guess I don't understand what you
12:19:53 just said.
12:19:53 **Q.** Well, sure. When you do your qualitative
12:19:56 analysis --
12:19:56 **A.** Okay.

12:19:56 **Q.** -- you are looking at DICOM data, but you are looking at it visually; right?
12:19:59
12:20:01 **A.** Yeah, we're looking at the MRI scan visually; correct.
12:20:04
12:20:05 **Q.** But you are not looking at the one's and zero's of the binary code that are in the DICOM data; correct?
12:20:07
12:20:10
12:20:10 **A.** That's correct.
12:20:12 **Q.** You are looking at a visualization of the DICOM data?
12:20:15
12:20:15 **A.** That's right.
12:20:15 **Q.** And it's important to understand, because some people -- when we talk about images, an MRI is not like -- it's not like -- I mean, you testified it's like a picture, but it's different than a picture; right?
12:20:16
12:20:19
12:20:21
12:20:24
12:20:25 **A.** Well, it is a picture. And just like a photograph, there's data in a photograph that's comprised of 2D pixels. In MRI images it's 3D voxels, but there are data in a picture and photograph. There are data in an MRI; correct.
12:20:28
12:20:30
12:20:35
12:20:37
12:20:39 **Q.** And so, when you are viewing it -- maybe you do it differently, but when I have seen MRI's it's sort of like a movie; right? It's a moving picture?
12:20:43
12:20:46
12:20:49 **A.** Yes, we typically -- it is 2D images in a

12:20:53 stack. So it would be analogous to like what you
12:20:56 just described, flipping through, like, images that
12:20:59 create a movie, so different pictures. And so you
12:21:02 are really looking at it as not one static image at
12:21:04 a time, but you are looking at it in a dynamic way
12:21:07 as you scroll through.
12:21:07 **Q.** And you scroll with your mouse, and you take
12:21:10 those pictures and you make a movie?
12:21:12 **A.** It's -- I don't think it's -- I wouldn't agree
12:21:15 with that, but you are definitely looking at it in a
12:21:18 dynamic way, but you are not making it into a movie.
12:21:22 **Q.** Okay. And the frames of that -- not movie --
12:21:27 the frames are different lengths, depending -- in
12:21:30 other words, when you are looking at the 2018 one,
12:21:33 each frame is a 1.5 millimeter slice; correct?
12:21:36 **A.** Correct.
12:21:36 **Q.** And when you are looking at the 2021, each
12:21:40 frame is a 1.2 millimeter slice?
12:21:42 **A.** Correct.
12:21:43 **Q.** So the old one, the slices are 25 percent
12:21:45 larger?
12:21:46 **A.** Mm-hmm.
12:21:46 **Q.** You have to say yes.
12:21:48 **A.** Yes. Yes.
12:21:48 **Q.** And when you look at those slices, they look

very different; right? Well, let me ask you --
A. I don't think they look very different to me.
Q. If you compare -- if you had two pictures --
A. Yes.
Q. -- of -- one of an MRI slice that's 1.2, and one of an MRI slice that's 1.5, you would be able to see a lot more gray matter in the 1.5?
A. No, that's not correct. Because if -- let's say you had the 1.5 millimeter-thick slice, and what did you say, a 2. --
Q. 1.2.
A. 1.2 -- well, just two different slice thicknesses. If you had two different slice thicknesses, you can't -- it's not -- that doesn't give you the ability to see more gray matter. In fact, if you put those up side by side, you wouldn't be able to tell which is the thicker slice and which is the thinner slice. You wouldn't be able to visually perceive that.

They would look nearly identical, so I don't really understand the question, I guess.
Q. So your testimony is just that they look identical?
A. Yeah, they would look nearly identical. I would -- I personally would not be able to tell you

12:22:48 that if I'm looking at two different slice
12:22:51 thicknesses of the ones you just described, I
12:22:53 wouldn't be able to tell you which one is the
12:22:54 thinner and which is the thicker at that slice
12:22:57 thickness.
12:22:57 **Q.** Okay. So your testimony is that you are
12:23:00 looking at a slice of MRI, one from a 1.2 and one
12:23:04 from a 1.5, you wouldn't be able --
12:23:05 **A.** There would be no way I would be able to tell
12:23:08 the difference. It's imperceptible for the human
12:23:10 eye to be able to do that.
12:23:11 **Q.** Although you, you know, have your own
12:23:14 experience, would it be fair to say that unlike a
12:23:16 computer, when you are looking at these slices your
12:23:19 mind can't compare them to a database of other
12:23:22 individuals in the same age?
12:23:23 **A.** Well, that's -- I think that's exactly what my
12:23:26 mind is doing. It's -- because the mind is a
12:23:28 computer. I mean, our brain is a computer -- human
12:23:32 intelligence. And what I'm saying is that, yeah, I
12:23:35 think -- my opinion is that what we do as
12:23:38 neuroradiologists is that we consume a large amount
12:23:41 of data about a range of normal and abnormal, and we
12:23:46 hold that in our brain. And we're able to take an
12:23:48 image, and then make a comparison from the database

12:23:51 that we have in our brain.
12:23:52 **Q.** Would you agree that humanity's advancing in
12:23:56 the modern era has had to do with leveraging large
12:23:59 sources of data that can be, you know, computed only
12:24:02 by computers?
12:24:03 **A.** Yes, absolutely. Yes.
12:24:05 **Q.** If you had a very large, fair sample in a
12:24:10 computer, that would be a very powerful tool for
12:24:13 analyzing DICOM data?
12:24:15 **A.** I think -- there is hope and promise. No one
12:24:18 knows for sure.
12:24:19 **Q.** But so your testimony is where we are today,
12:24:22 it's better just for you to look at it than to use
12:24:26 the computer program to analyze it?
12:24:27 **A.** Yes, because of the limitations of the
12:24:29 computer, and what it does to the data.
12:24:31 **Q.** Okay. So another question -- I'm also
12:24:37 cognizant -- I'm --
12:24:40 MR. MAGNANI: I was not planning to go
12:24:41 this long, Your Honor.
12:24:42 THE COURT: Right. Well, we've got to
12:24:45 break, because I've got to run and do something over
12:24:48 the lunch hour. Let's break until 1:30, and then
12:24:52 we'll start up again.
12:24:53 Here's the deal about the schedule.

12:24:56 Tomorrow morning -- tomorrow we're not going to have
12:24:58 a full day. We're probably not going to start
12:25:01 tomorrow until, like, 11 o'clock, because I have
12:25:03 stuff that I need to get done. Because I didn't
12:25:05 anticipate this going as long as it has.
12:25:08 No one's at fault. It's not a
12:25:10 problem, but it's that I have other things that I
12:25:12 need to get done before the Thanksgiving holidays,
12:25:17 and get parties aligned for next week. So, you
12:25:20 know, if we can't finish -- just put everyone on
12:25:22 notice if we can't finish tomorrow we're coming back
12:25:25 on Friday, just so you all know. I know that might
12:25:28 be a hardship, but we've gotta finish this hearing.
12:25:31 MR. LOONAM: Your Honor, and I -- I
12:25:33 guess -- is there -- are we able to work until --
12:25:35 THE COURT: Just like, as usual, until
12:25:37 seven o'clock.
12:25:39 MR. LOONAM: I am very confident we
12:25:41 will be able to finish by tomorrow.
12:25:44 THE COURT: Okay. I'm just telling you
12:25:45 guys, if you don't finish by tomorrow then we'll
12:25:47 have to go until Friday. We don't have a choice.
12:25:51 Great. So let's go ahead and break right now.
12:25:53 Let's all be back at 1:30, and then we'll continue
12:25:56 on.

12:25:58 I've been working on sort of the
12:26:00 findings as we've been going along. So if you can
12:26:03 get me the information -- you know, from the
12:26:05 witnesses, then do a closing on Wednesday. Then
12:26:11 I'll be getting an answer back to you as quick as I
12:26:14 can.
12:26:14 MR. VARNADO: Judge, we had a schedule
12:26:15 for post-hearing briefing on this. If you'll recall
12:26:18 when we had our status conference we were not going
12:26:20 to do closings, and also in the interest of time,
12:26:22 and given the volume of information.
12:26:24 So I think the parties wanted to
12:26:26 convene and come upon -- I think our original
12:26:30 proposed briefing schedule is far too short to get
12:26:32 you everything you need. And we would like to sort
12:26:34 of not compromise all of our holidays and come to an
12:26:37 agreement, and come to you with a proposal on a
12:26:40 briefing schedule.
12:26:40 THE COURT: That would be great.
12:26:41 Because I -- there's a lot of questions that I have.
12:26:45 They'll probably be answered either with these
12:26:46 witnesses or the briefing schedule.
12:26:48 MR. VARNADO: Okay.
12:26:49 MR. MAGNANI: If I could, Your Honor?
12:26:50 One other thing is -- well, one, if Your Honor wants

12:26:52 briefing of course we'll stick to the original plan.
12:26:55 But I think it might be helpful at some point before
12:26:58 we go off and leave if you could sort of focus that
12:27:00 briefing and tell us which areas you would like us
12:27:03 to address.
12:27:03 THE COURT: That's why I've been
12:27:05 working on these findings. So I'm figuring out
12:27:08 where the gaps are, and we can talk tomorrow about
12:27:10 that.
12:27:11 MR. VARNADO: That would be helpful.
12:27:12 MR. MAGNANI: Well, we'd ask if you
12:27:13 could tell us the important parts after the close of
12:27:16 evidence so that there's opportunity to address them
12:27:18 and not keep us here until Christmas.
12:27:20 THE COURT: Right. I've got it. I'll
12:27:21 get back to you. Recess until 1:30.

(WHEREUPON, THE PROCEEDINGS WERE RECESSED UNTIL 12:27 P.M.)

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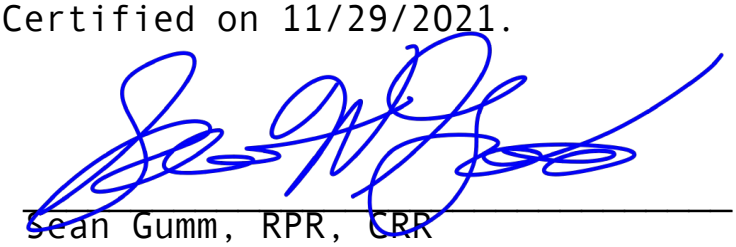
CERTIFICATE

I hereby certify that pursuant to Title 28, Section 753 United States Code, the foregoing is a true and correct transcript of the stenographically reported proceedings in the above matter.

Certified on 11/29/2021.



Sean Gumm, RPR, CRR

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